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DATA COMPILATION REPORT: ROADWAY HEIGHT MEASUREMENTS, 9 AND 10 EAST PANELS, LINGAN MINE, SYDNEY COALFIELD, N.S.

G.R. Corbett, D.A. Young and T.R.C. Aston

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DATA COMPILATION REPORT: ROADWAY HEIGHT MEASUREMENTS, 9 AND 10 EAST PANELS, LINGAN MINE, SYDNEY COALFIELD, N.S.

by

G.R. Corbett*, D.A. Young* and T.R.C. Aston**

ABSTRACT

The report represents a data base of roadway height measurements collected from the 9 and 10 East panels at Lingan Mine during 1987. An analysis of the data is not undertaken.

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RAPPORT DE COMPILATION DE DONNÉES : MESURES DE LA HAUTEUR DES VOIES, PANNEAUX 9 ET 10 EST, MINE LINGAN, CHAMP HOUILLER DE SYDNEY (N.-É.)

par

D.A. Young, G.R. Corbett et T.R.C. Aston

RÉSUMÉ

Le présent constitue une base de données sur la hauteur des voies mesurée dans les panneaux 9 et 10 est, à la mine Lingan, en 1987-88. Aucune analyse des données n'a été entreprise.

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INTRODUCTION

In 1983, an extensive roadway deformation survey program was undertaken by the Cape Breton Coal Research Laboratory (CBCRL) as part of an ongoing barrier pillar research program in the Sydney Coalfield, N.S. (1). The survey resulted in the collection of some 35 km of roadway deformation data (roadway height, width and cross-sectional area) from the Lingan and No. 26 Mines. This data base was subsequently analysed at McGill University via an EMR-RAP agreement (2).

In 1987, the gateroad deformation data base was extended by undertaking roadway height surveys along both the top and bottom levels of the 9 and 10 East panels at Lingan Mine, Figure 1. The purpose of this report is to present the collected data in a compiled format for easy reference and future analysis. An analysis of the data is not undertaken.

DATA COLLECTION AND PROCESSING

The underground surveys consisted of taking measurements, using a metric tape, from the base of the rail to the arch crown, Figures 2 and 3. In the face end region, where the rails had not yet been laid, measurements were taken from the arch crown to the floor. However, care was taken to ensure that the floor was 'reasonably level' and not obviously covered with foreign material such as 'large' loose rocks, timbers, debris, etc. Measurements were taken at three-arch intervals (3) from the original face startline to the arch closest the 'brushing lip'.

Once collected, the data was transferred to an IBM compatible microcomputer using spreadsheet software. Graphs were then plotted showing both the height and % reduction in arch height along the roadway. Figures 4 to 7 show the 9 East panel data and Figures 8 to 11 the 10 East panel data.

The original field data (roadway or arch heights) along with the reduction in height and % reduction in height values is given in the following Appendices:

Appendix A - 9 East Top Level
Appendix B - 9 East Bottom Level
Appendix C - 10 East Top Level
Appendix D - 10 East Bottom Level

DISCUSSION

Roadway height measurements (vertical distance between the arch crown and floor/track) are often referred to as 'roadway deformation' measurements. This terminology is not correct, since true roadway deformation measurements would require height, width and/or arch profile/cross-sectional area measurements at each of the intervals monitored. The roadway height measurements collected during this type of survey represent the 'roadway working height'. Normally, roadway deformation is inferred to mean the reduction in roadway height/profile due to strata movement. However, the 'working height' measurements are actually influenced by four main factors:

1) Roof strata displacement
2) Floor heave
3) Arch leg penetration into the floor
4) Waste rock/material not removed from the roadway floor

Experience indicates that the survey method, using experienced personnel, can give results with an accuracy of much better than ±5 cm, which with a 12 ft (3.65 m) arch is better than ±1%.

CONCLUSION

A significant data base of roadway height and deformation data now exists regarding the advance longwall operations of the Sydney Coalfield, N.S. and in particular those at Lingan Mine. Subsequent analysis of this data with regard to such parameters as arch and pack type, geology and barrier pillar width will allow continued improvements to be made in the development and implimentation of future advance and dual-life roadway support techniques.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the contributions made by Mr. Bill Gallant and Mr. Shane O'Leary of CBCRL during the field data collection phase of this project.

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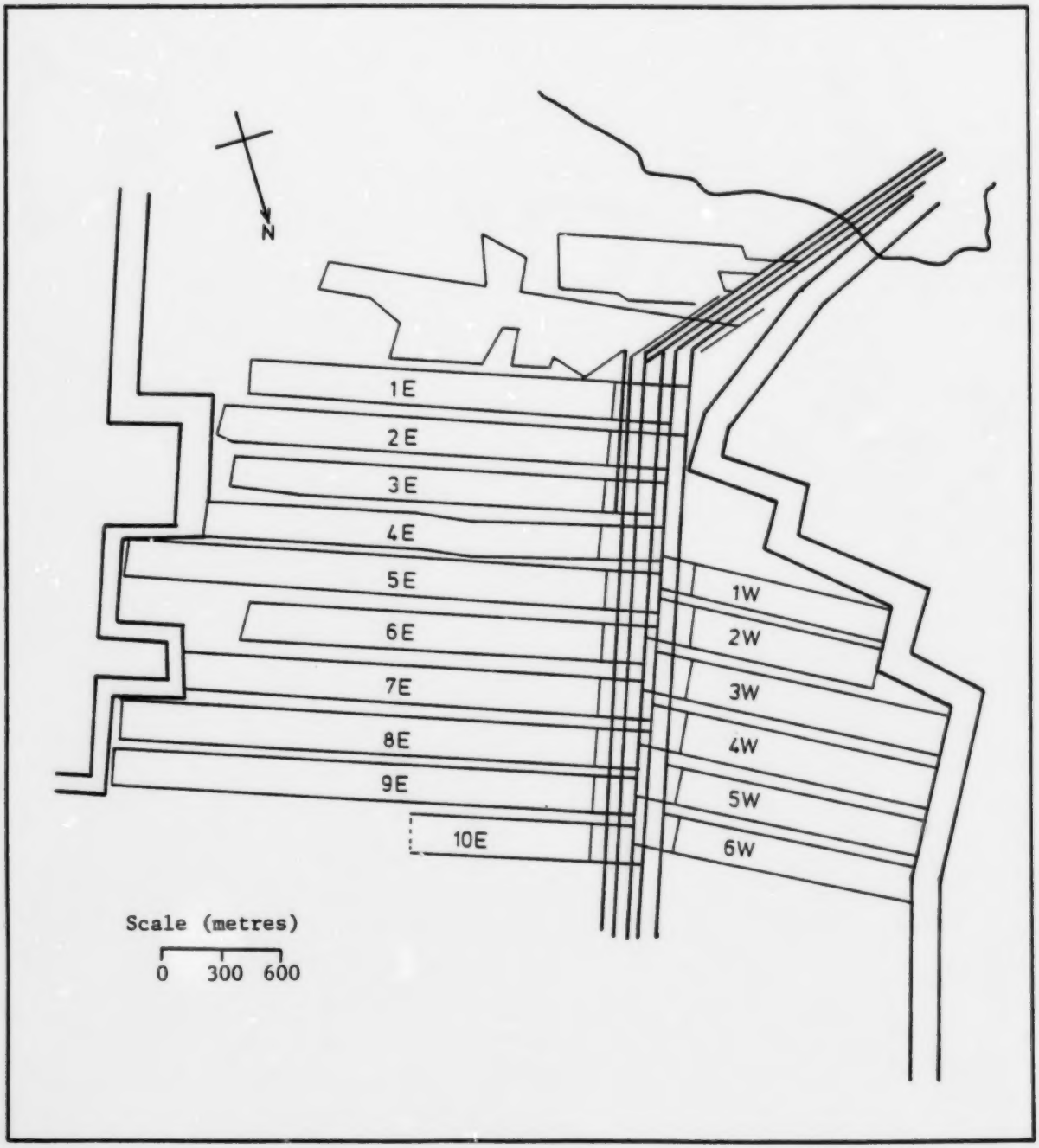

Figure 1 - Plan of Lingan Mine

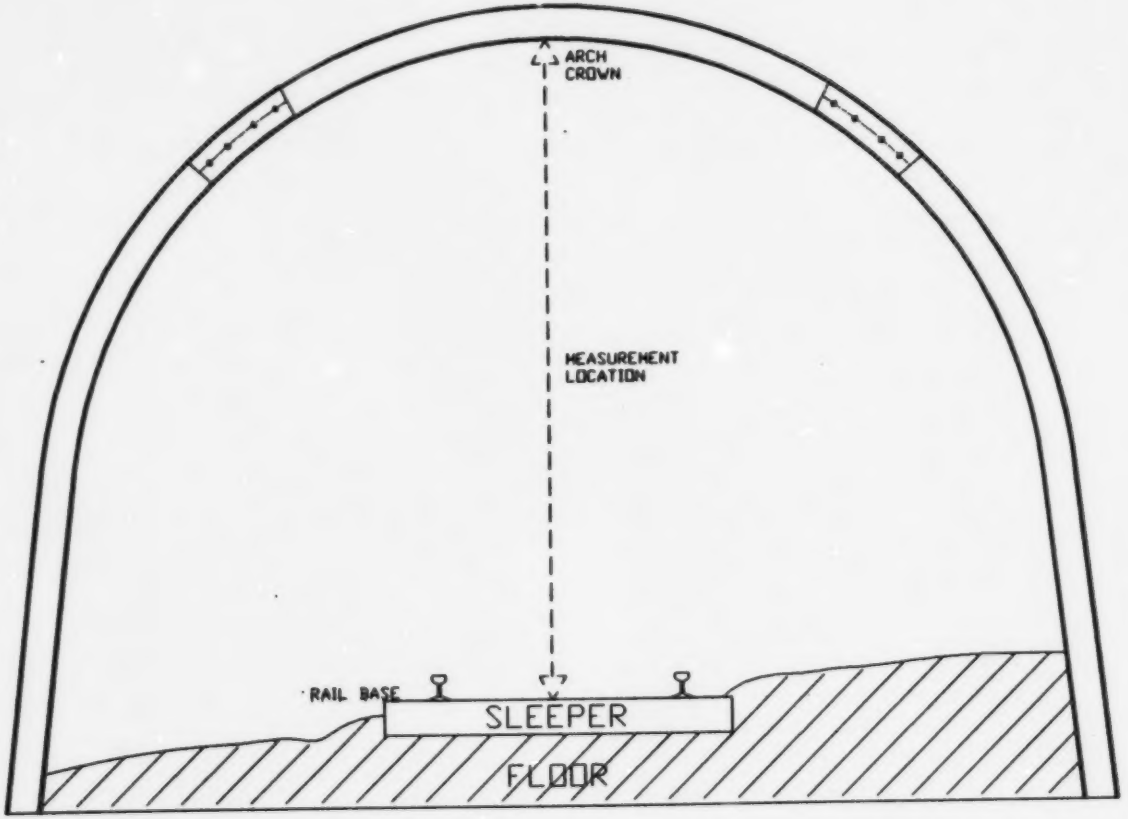

Figure 2 - Measurement location, typical mine arch

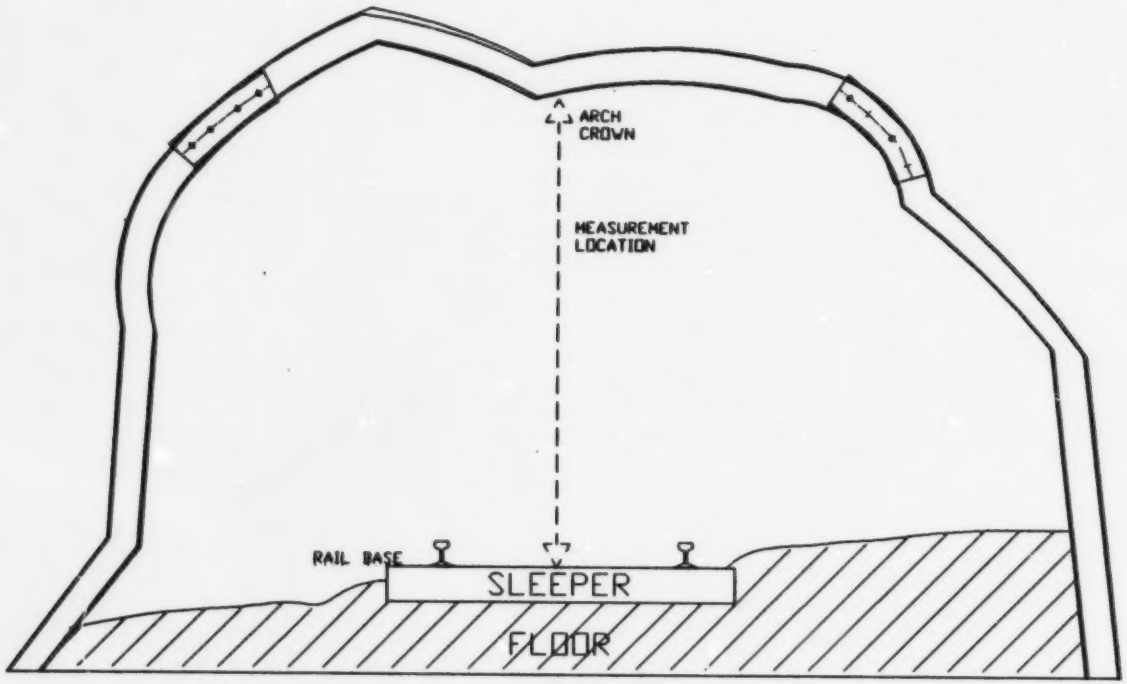

Figure 3 - Measurement location, deformed mine arch

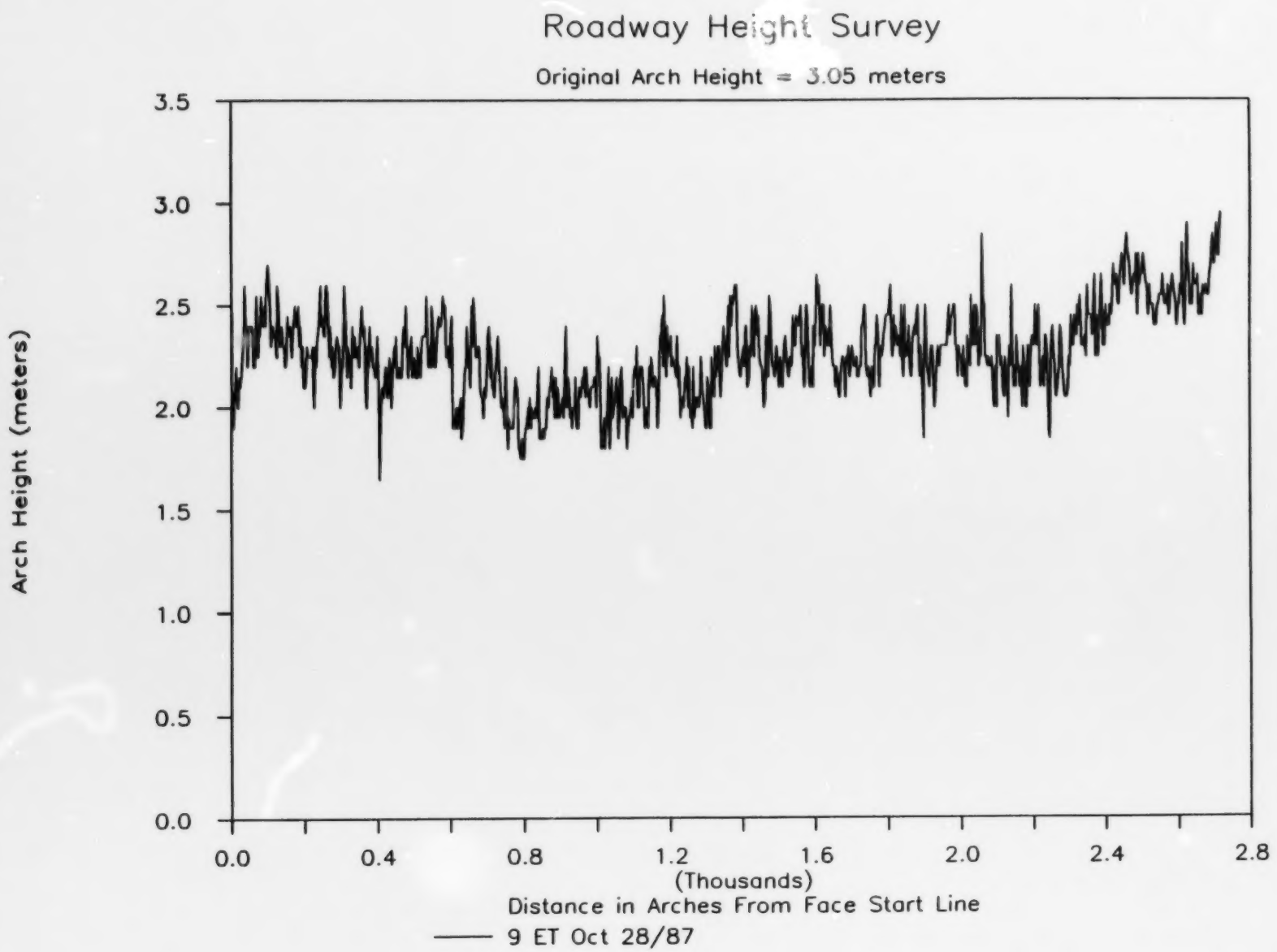

Figure 4 - 9 East top roadway arch heights

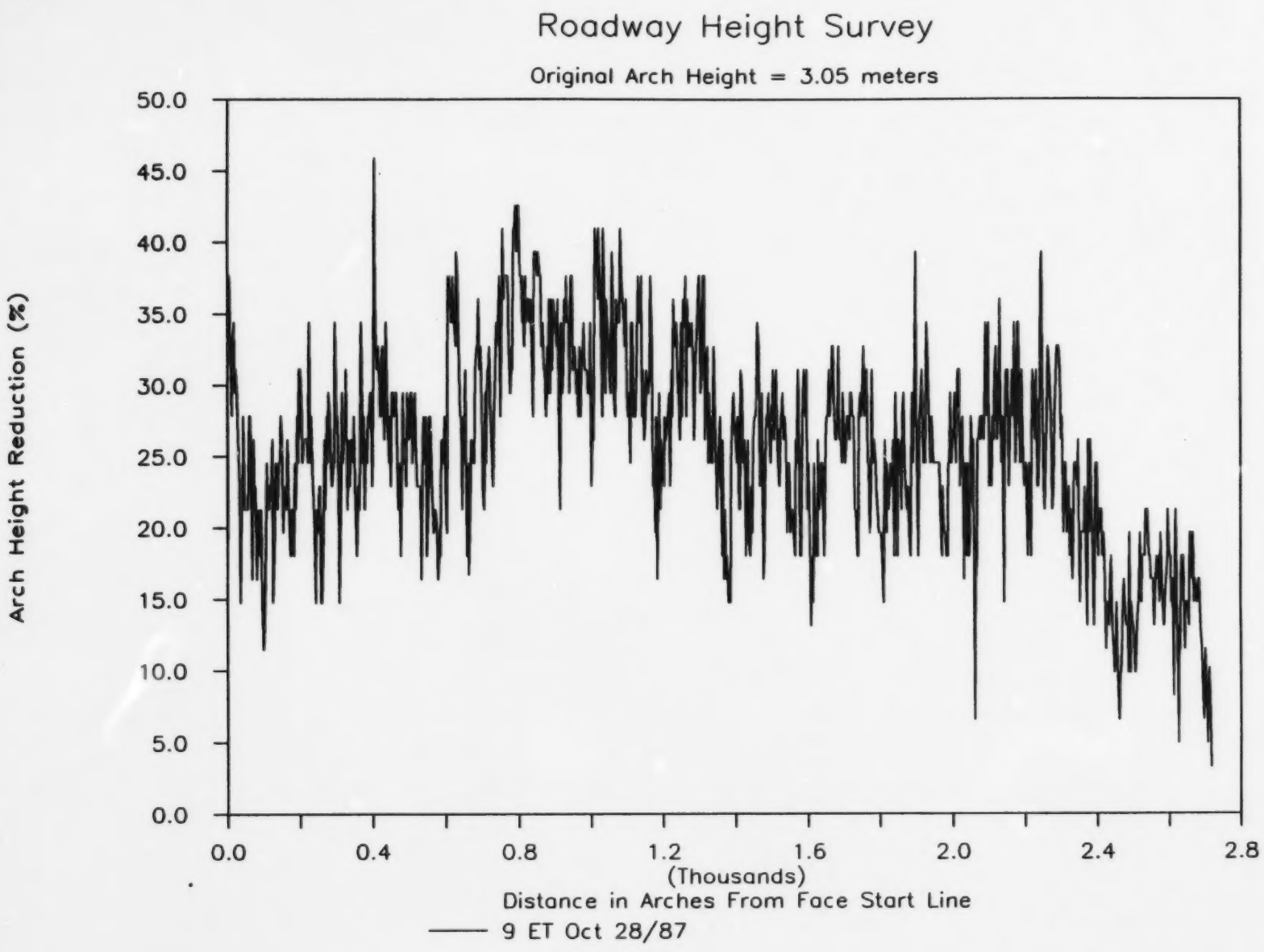

Figure 5 - 9 East top roadway % arch height reduction

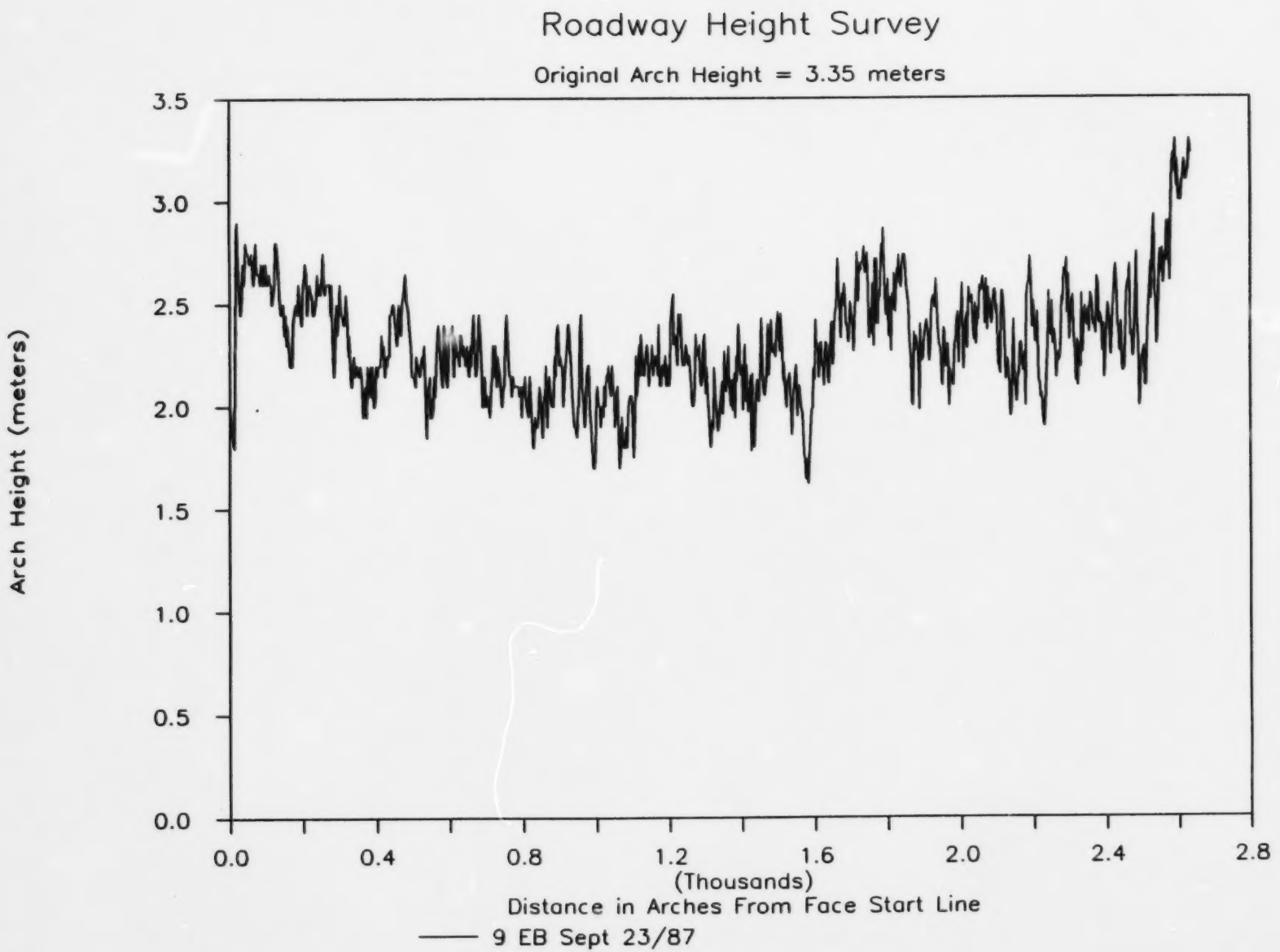

Figure 6 - 9 East bottom roadway arch heights

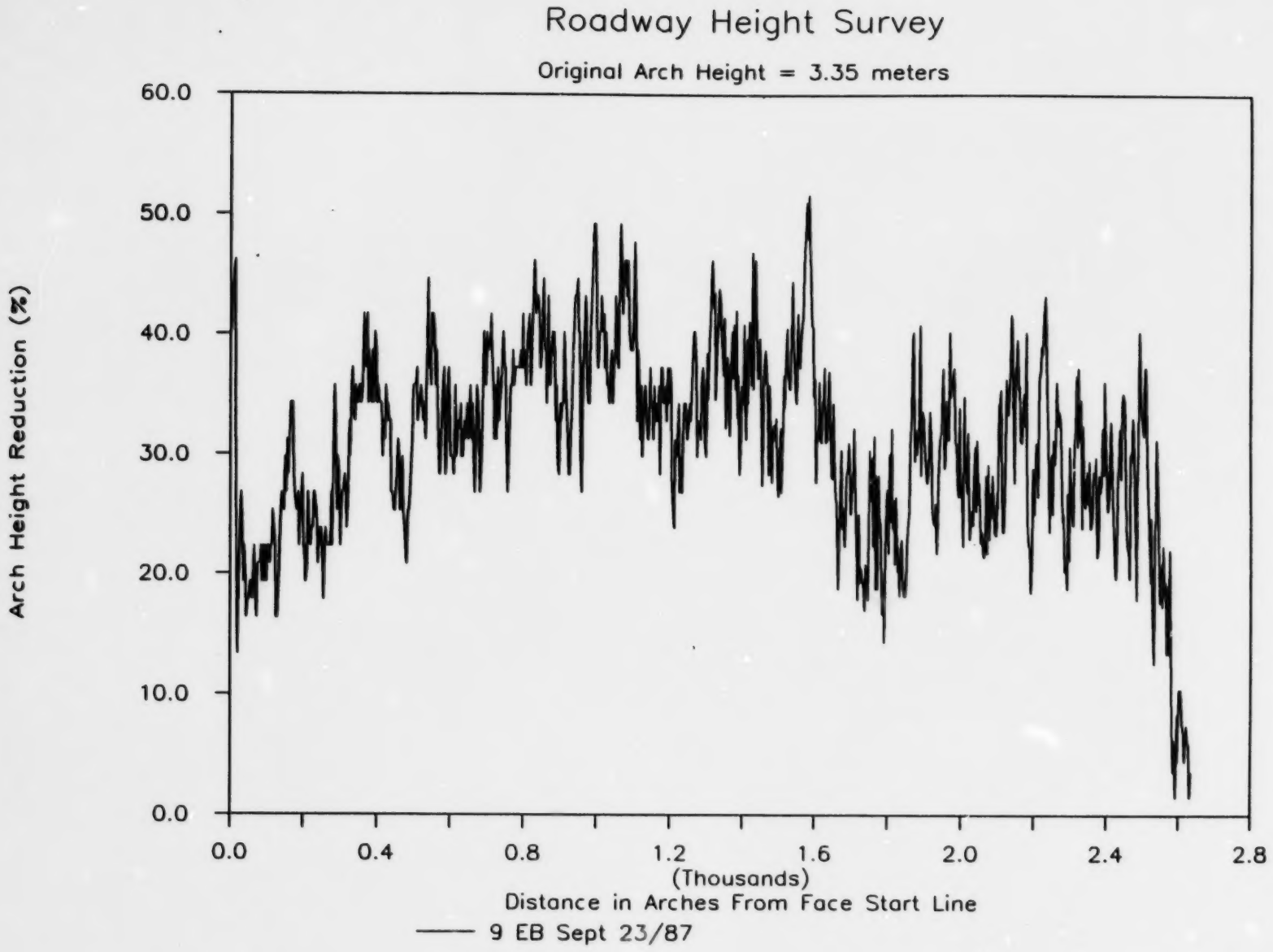

Figure 7 - 9 East bottom roadway % arch height reduction

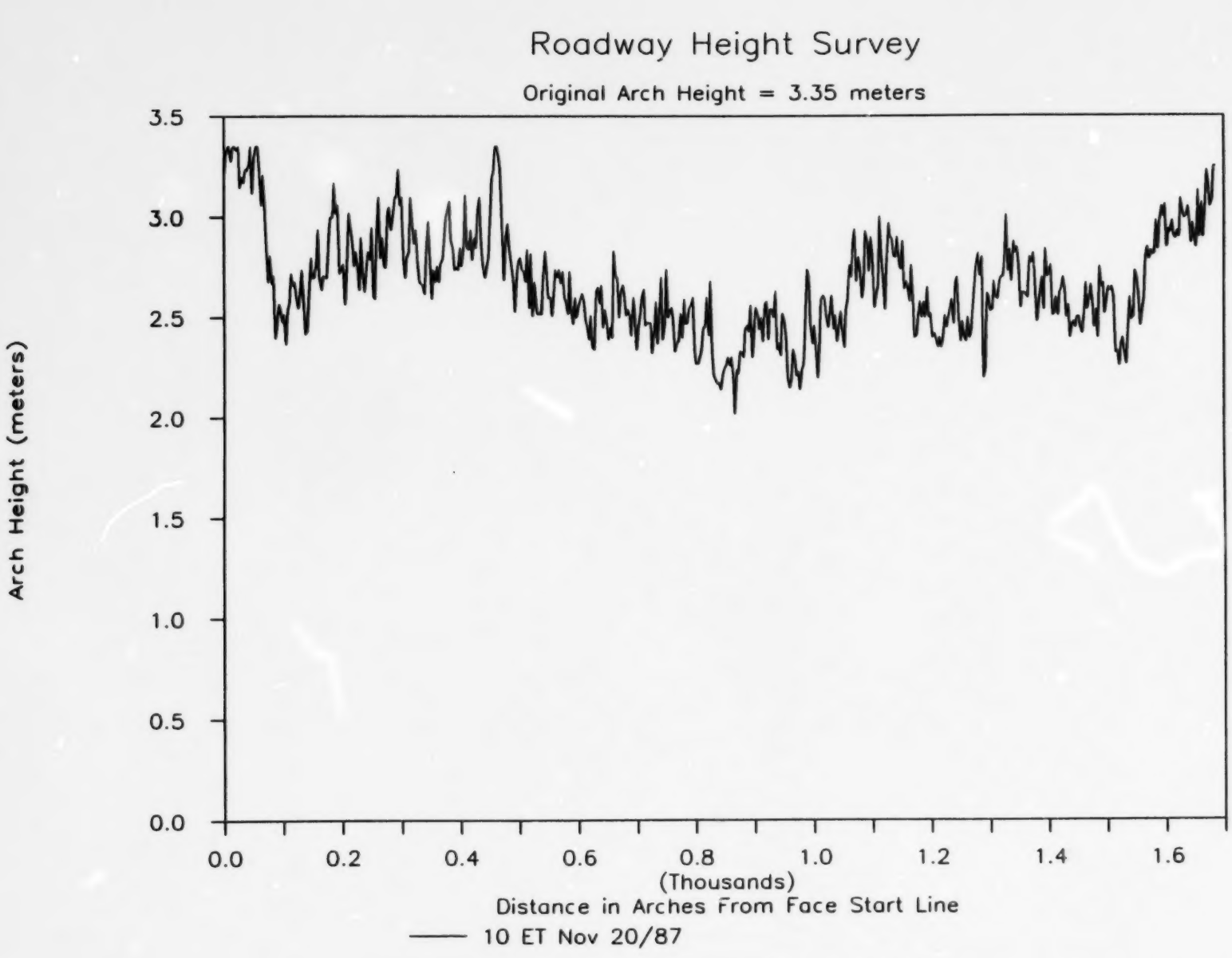

Figure 8 - 10 East top roadway arch heights

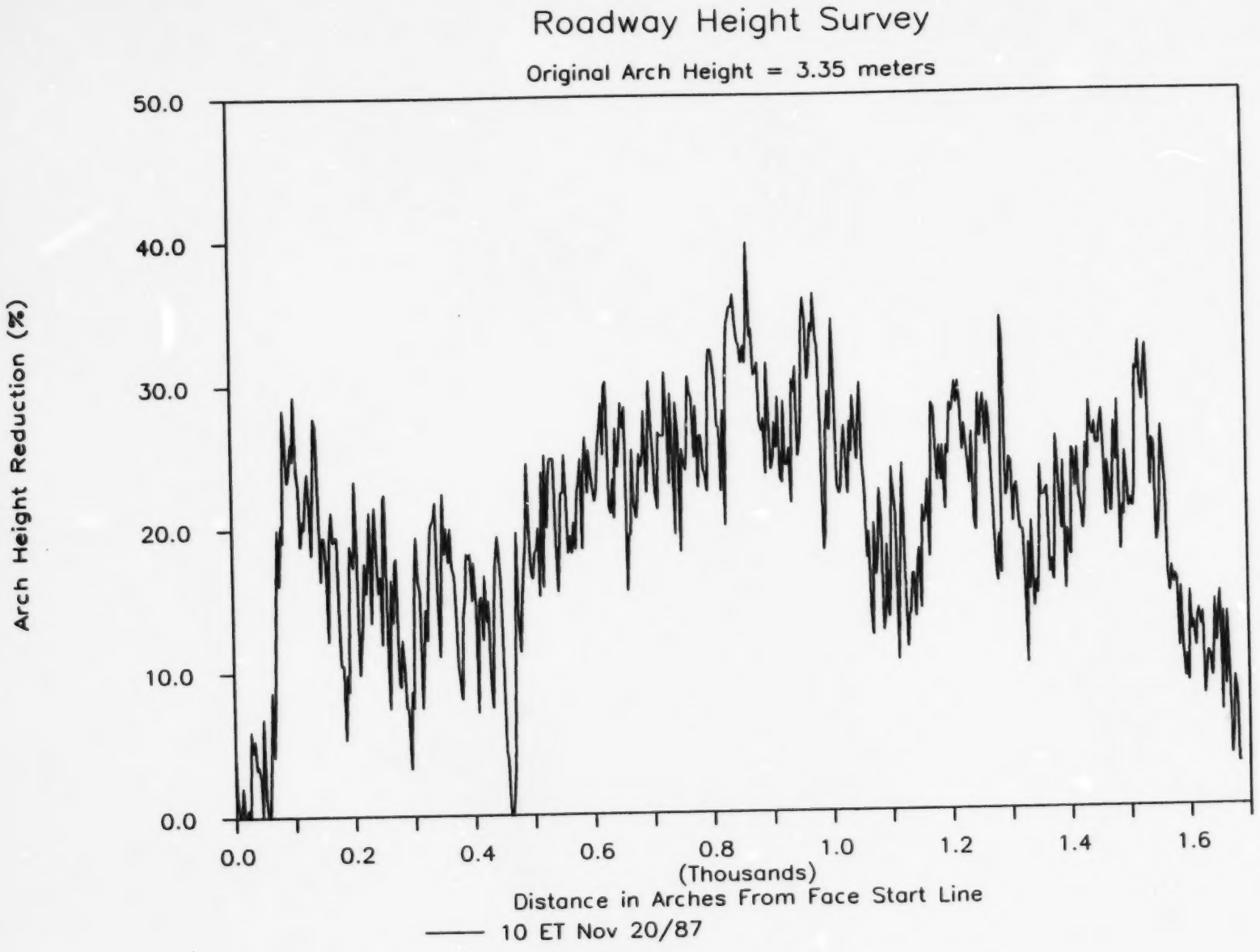

Figure 9 - 10 East top roadway % arch height reduction

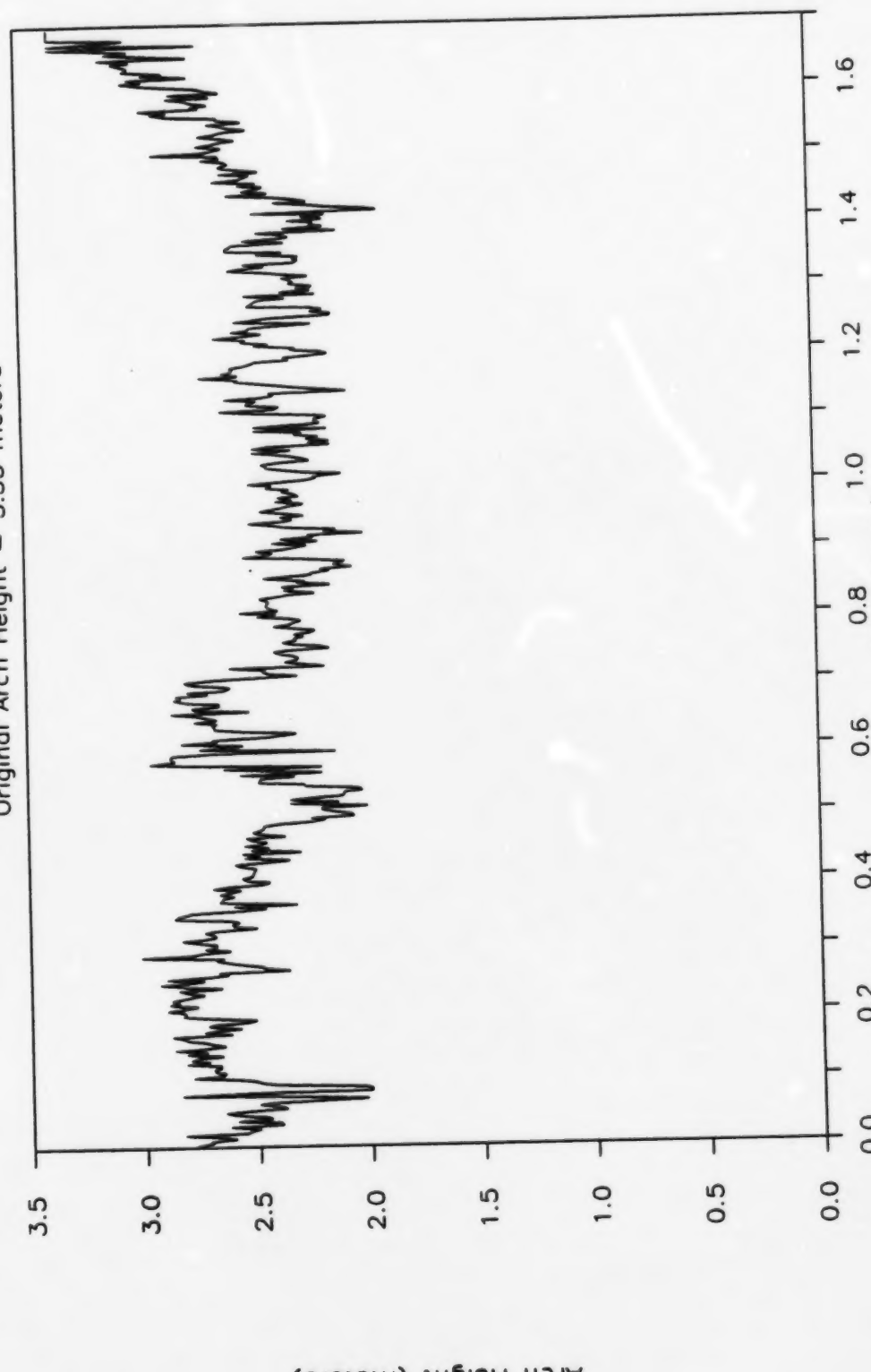

Figure 10 - 10 East bottom roadway arch heights

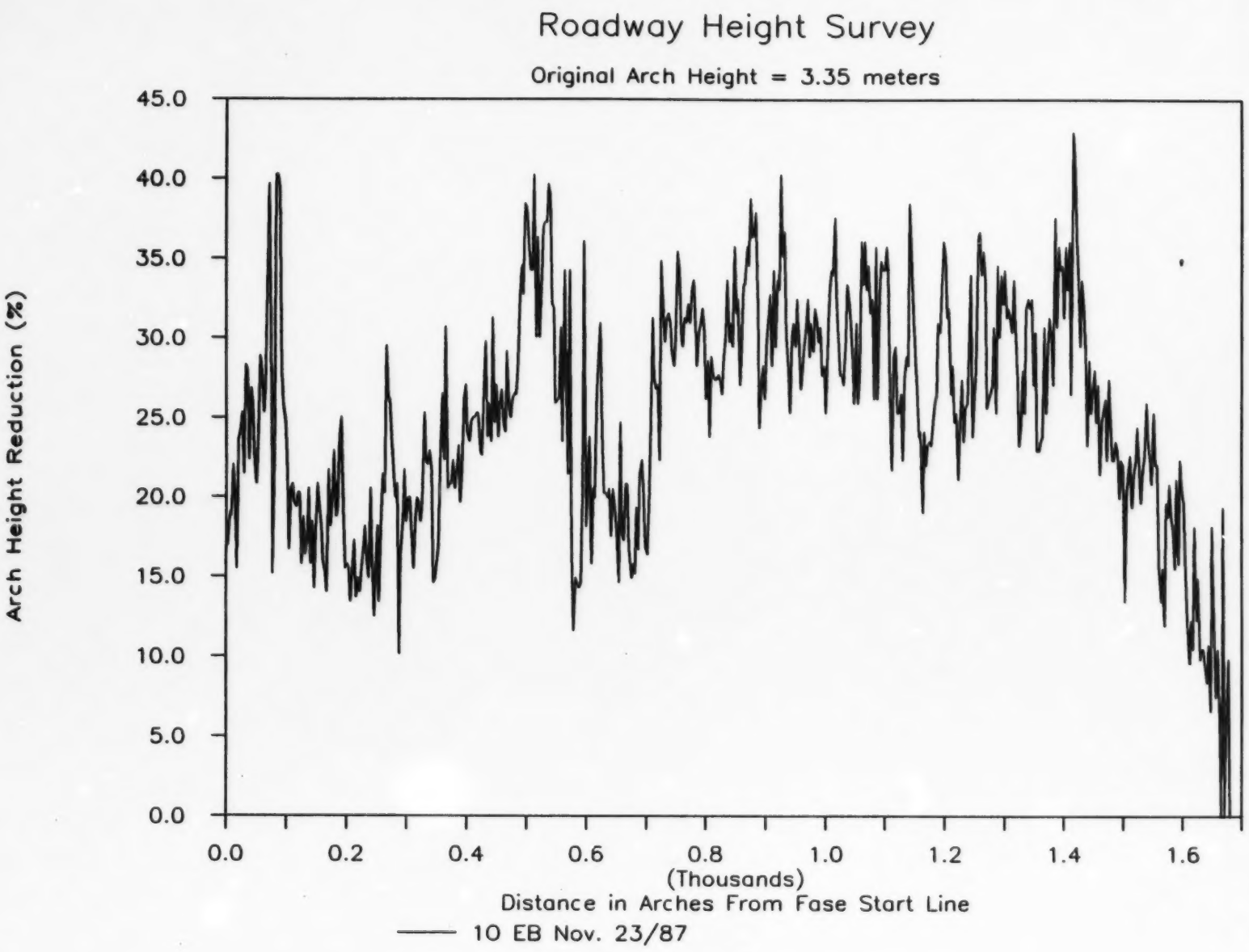

Figure 11 - 10 East bottom roadway % arch height reduction

APPENDIX A

9 East Top Level

LINGAN COLLIERY
ARCH SURVEY OF 9 EAST TOP
OCTOBER 28,1987
ORIGINAL ARCH HEIGHT IS 3.05 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
0	2.65	0.40	13.1	906	2.05	1.00	32.8	1812	2.35	0.70	23.0
3	1.90	1.15	37.7	909	1.95	1.10	36.1	1815	2.25	0.80	26.2
6	1.90	1.15	37.7	912	2.15	0.90	29.5	1818	2.45	0.60	19.7
9	2.05	1.00	32.8	915	2.40	0.65	21.3	1821	2.30	0.75	24.6
12	2.20	0.85	27.9	918	2.00	1.05	34.4	1824	2.40	0.65	21.3
15	2.10	0.95	31.1	921	2.15	0.90	29.5	1827	2.35	0.70	23.0
18	2.00	1.05	34.4	924	2.10	0.95	31.1	1830	2.30	0.75	24.6
21	2.15	0.90	29.5	927	1.95	1.10	36.1	1833	2.35	0.70	23.0
24	2.10	0.95	31.1	930	2.00	1.05	34.4	1836	2.25	0.80	26.2
27	2.16	0.89	29.2	933	1.90	1.15	37.7	1839	2.50	0.55	18.0
30	2.25	0.80	26.2	936	2.00	1.05	34.4	1842	2.25	0.80	26.2
33	2.35	0.70	23.0	939	2.00	1.05	34.4	1845	2.15	0.90	29.5
36	2.60	0.45	14.8	942	2.15	0.90	29.5	1848	2.50	0.55	18.0
39	2.40	0.65	21.3	945	1.90	1.15	37.7	1851	2.25	0.80	26.2
42	2.40	0.65	21.3	948	1.90	1.15	37.7	1854	2.25	0.80	26.2
45	2.20	0.85	27.9	951	2.10	0.95	31.1	1857	2.30	0.75	24.6
48	2.40	0.65	21.3	954	2.10	0.95	31.1	1860	2.40	0.65	21.3
51	2.40	0.65	21.3	957	2.05	1.00	32.8	1863	2.20	0.85	27.9
54	2.40	0.65	21.3	960	2.15	0.90	29.5	1866	2.15	0.90	29.5
57	2.40	0.65	21.3	963	2.10	0.95	31.1	1869	2.30	0.75	24.6
60	2.20	0.85	27.9	966	2.20	0.85	27.9	1872	2.35	0.70	23.0
63	2.20	0.85	27.9	969	2.05	1.00	32.8	1875	2.40	0.65	21.3
66	2.35	0.70	23.0	972	2.20	0.85	27.9	1878	2.35	0.70	23.0
69	2.55	0.50	16.4	975	2.10	0.95	31.1	1881	2.45	0.60	19.7
72	2.25	0.80	26.2	978	2.05	1.00	32.8	1884	2.50	0.55	18.0
75	2.40	0.65	21.3	981	2.00	1.05	34.4	1887	2.30	0.75	24.6
78	2.35	0.70	23.0	984	2.10	0.95	31.1	1890	2.15	0.90	29.5
81	2.55	0.50	16.4	987	2.10	0.95	31.1	1893	2.30	0.75	24.6

LINGAN COLLIERY
ARCH SURVEY OF 9 EAST TOP
OCTOBER 28,1987
ORIGINAL ARCH HEIGHT IS 3.05 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
84	2.45	0.60	19.7	990	2.10	0.95	31.1	1896	2.15	0.90	29.5
87	2.40	0.65	21.3	993	2.15	0.90	29.5	1899	1.85	1.20	39.3
90	2.50	0.55	18.0	996	2.15	0.90	29.5	1902	2.15	0.90	29.5
93	2.40	0.65	21.3	999	2.00	1.05	34.4	1905	2.50	0.55	18.0
96	2.60	0.45	14.8	1002	2.35	0.70	23.0	1908	2.30	0.75	24.6
99	2.70	0.35	11.5	1005	2.25	0.80	26.2	1911	2.20	0.85	27.9
102	2.65	0.40	13.1	1008	2.25	0.80	26.2	1914	2.15	0.90	29.5
105	2.55	0.50	16.4	1011	1.80	1.25	41.0	1917	2.10	0.95	31.1
108	2.30	0.75	24.6	1014	1.80	1.25	41.0	1920	2.30	0.75	24.6
111	2.40	0.65	21.3	1017	1.85	1.20	39.3	1923	2.25	0.80	26.2
114	2.40	0.65	21.3	1020	1.95	1.10	36.1	1926	2.30	0.75	24.6
117	2.35	0.70	23.0	1023	1.80	1.25	41.0	1929	2.00	1.05	34.4
120	2.35	0.70	23.0	1026	1.90	1.15	37.7	1932	2.05	1.00	32.8
123	2.25	0.80	26.2	1029	2.00	1.05	34.4	1935	2.15	0.90	29.5
126	2.60	0.45	14.8	1032	2.20	0.85	27.9	1938	2.25	0.80	26.2
129	2.50	0.55	18.0	1035	1.80	1.25	41.0	1941	2.30	0.75	24.6
132	2.30	0.75	24.6	1038	1.90	1.15	37.7	1944	2.20	0.85	27.9
135	2.35	0.70	23.0	1041	2.15	0.90	29.5	1947	2.30	0.75	24.6
138	2.40	0.65	21.3	1044	1.95	1.10	36.1	1950	2.30	0.75	24.6
141	2.30	0.75	24.6	1047	2.00	1.05	34.4	1953	2.30	0.75	24.6
144	2.30	0.75	24.6	1050	2.05	1.00	32.8	1956	2.30	0.75	24.6
147	2.20	0.85	27.9	1053	2.10	0.95	31.1	1959	2.30	0.75	24.6
150	2.25	0.80	26.2	1056	2.15	0.90	29.5	1962	2.30	0.75	24.6
153	2.45	0.60	19.7	1059	1.85	1.20	39.3	1965	2.30	0.75	24.6
156	2.35	0.70	23.0	1062	1.95	1.10	36.1	1968	2.45	0.60	19.7
159	2.40	0.65	21.3	1065	2.15	0.90	29.5	1971	2.50	0.55	18.0
162	2.40	0.65	21.3	1068	2.20	0.85	27.9	1974	2.35	0.70	23.0
165	2.25	0.80	26.2	1071	1.95	1.10	36.1	1977	2.45	0.60	19.7

LINGAN COLLIERY
ARCH SURVEY OF 9 EAST TOP
OCTOBER 28,1987
ORIGINAL ARCH HEIGHT IS 3.05 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
168	2.35	0.70	23.0	1074	2.00	1.05	34.4	1980	2.45	0.60	19.7
171	2.45	0.60	19.7	1077	2.00	1.05	34.4	1983	2.50	0.55	18.0
174	2.50	0.55	18.0	1080	2.00	1.05	34.4	1986	2.50	0.55	18.0
177	2.40	0.65	21.3	1083	1.80	1.25	41.0	1989	2.30	0.75	24.6
180	2.40	0.65	21.3	1086	1.90	1.15	37.7	1992	2.30	0.75	24.6
183	2.50	0.55	18.0	1089	1.95	1.10	36.1	1995	2.15	0.90	29.5
186	2.30	0.75	24.6	1092	2.00	1.05	34.4	1998	2.30	0.75	24.6
189	2.40	0.65	21.3	1095	2.05	1.00	32.8	2001	2.25	0.80	26.2
192	2.20	0.85	27.9	1098	1.95	1.10	36.1	2004	2.25	0.80	26.2
195	2.30	0.75	24.6	1101	2.15	0.90	29.5	2007	2.15	0.90	29.5
198	2.10	0.95	31.1	1104	2.20	0.85	27.9	2010	2.30	0.75	24.6
201	2.10	0.95	31.1	1107	2.15	0.90	29.5	2013	2.20	0.85	27.9
204	2.20	0.85	27.9	1110	2.30	0.75	24.6	2016	2.10	0.95	31.1
207	2.30	0.75	24.6	1113	2.00	1.05	34.4	2019	2.10	0.95	31.1
210	2.25	0.80	26.2	1116	2.00	1.05	34.4	2022	2.35	0.70	23.0
213	2.25	0.80	26.2	1119	2.20	0.85	27.9	2025	2.25	0.80	26.2
216	2.25	0.80	26.2	1122	2.20	0.85	27.9	2028	2.20	0.85	27.9
219	2.25	0.80	26.2	1125	2.20	0.85	27.9	2031	2.55	0.50	16.4
222	2.30	0.75	24.6	1128	2.10	0.95	31.1	2034	2.35	0.70	23.0
225	2.00	1.05	34.4	1131	1.90	1.15	37.7	2037	2.30	0.75	24.6
228	2.30	0.75	24.6	1134	1.95	1.10	36.1	2040	2.50	0.55	18.0
231	2.20	0.85	27.9	1137	2.00	1.05	34.4	2043	2.30	0.75	24.6
234	2.35	0.70	23.0	1140	1.90	1.15	37.7	2046	2.50	0.55	18.0
237	2.35	0.70	23.0	1143	2.20	0.85	27.9	2049	2.45	0.60	19.7
240	2.45	0.60	19.7	1146	2.10	0.95	31.1	2052	2.20	0.85	27.9
243	2.60	0.45	14.8	1149	2.25	0.80	26.2	2055	2.25	0.80	26.2
246	2.40	0.65	21.3	1152	2.20	0.85	27.9	2058	2.25	0.80	26.2
249	2.45	0.60	19.7	1155	2.10	0.95	31.1	2061	2.85	0.20	6.6

LINGAN COLLIERY
ARCH SURVEY OF 9 EAST TOP
OCTOBER 28,1987
ORIGINAL ARCH HEIGHT IS 3.05 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
252	2.35	0.70	23.0
255	2.35	0.70	23.0
258	2.60	0.45	14.8
261	2.60	0.45	14.8
264	2.45	0.60	19.7
267	2.25	0.80	26.2
270	2.40	0.65	21.3
273	2.20	0.85	27.9
276	2.30	0.75	24.6
279	2.15	0.90	29.5
282	2.20	0.85	27.9
285	2.30	0.75	24.6
288	2.35	0.70	23.0
291	2.30	0.75	24.6
294	2.30	0.75	24.6
297	2.00	1.05	34.4
300	2.20	0.85	27.9
303	2.20	0.85	27.9
306	2.35	0.70	23.0
309	2.60	0.45	14.8
312	2.40	0.65	21.3
315	2.15	0.90	29.5
318	2.30	0.75	24.6
321	2.25	0.80	26.2
324	2.25	0.80	26.2
327	2.10	0.95	31.1
330	2.40	0.65	21.3
333	2.25	0.80	26.2

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
1158	2.15	0.90	29.5
1161	2.15	0.90	29.5
1164	2.10	0.95	31.1
1167	1.90	1.15	37.7
1170	2.05	1.00	32.8
1173	2.35	0.70	23.0
1176	2.30	0.75	24.6
1179	2.45	0.60	19.7
1182	2.20	0.85	27.9
1185	2.55	0.50	16.4
1188	2.30	0.75	24.6
1191	2.15	0.90	29.5
1194	2.40	0.65	21.3
1197	2.25	0.80	26.2
1200	2.30	0.75	24.6
1203	2.35	0.70	23.0
1206	2.20	0.85	27.9
1209	2.25	0.80	26.2
1212	2.20	0.85	27.9
1215	2.20	0.85	27.9
1218	2.15	0.90	29.5
1221	2.35	0.70	23.0
1224	2.10	0.95	31.1
1227	2.20	0.85	27.9
1230	1.95	1.10	36.1
1233	2.05	1.00	32.8
1236	2.00	1.05	34.4
1239	2.00	1.05	34.4

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
2064	2.55	0.50	16.4
2067	2.50	0.55	18.0
2070	2.25	0.80	26.2
2073	2.25	0.80	26.2
2076	2.20	0.85	27.9
2079	2.25	0.80	26.2
2082	2.20	0.85	27.9
2085	2.20	0.85	27.9
2088	2.25	0.80	26.2
2091	2.05	1.00	32.8
2094	2.00	1.05	34.4
2097	2.20	0.85	27.9
2100	2.00	1.05	34.4
2103	2.35	0.70	23.0
2106	2.30	0.75	24.6
2109	2.35	0.70	23.0
2112	2.20	0.85	27.9
2115	2.25	0.80	26.2
2118	2.10	0.95	31.1
2121	2.05	1.00	32.8
2124	2.25	0.80	26.2
2127	2.20	0.85	27.9
2130	2.15	0.90	29.5
2133	1.95	1.10	36.1
2136	2.30	0.75	24.6
2139	2.20	0.85	27.9
2142	2.60	0.45	14.8
2145	2.30	0.75	24.6

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336	2.35	0.70	23.0	1242	2.15	0.90	29.5	2148	2.10	0.95	31.1
339	2.25	0.80	26.2	1245	2.10	0.95	31.1	2151	2.20	0.85	27.9
342	2.25	0.80	26.2	1248	2.25	0.80	26.2	2154	2.10	0.95	31.1
345	2.30	0.75	24.6	1251	2.00	1.05	34.4	2157	2.35	0.70	23.0
348	2.20	0.85	27.9	1254	2.20	0.85	27.9	2160	2.20	0.85	27.9
351	2.35	0.70	23.0	1257	1.95	1.10	36.1	2163	2.20	0.85	27.9
354	2.45	0.60	19.7	1260	2.00	1.05	34.4	2166	2.10	0.95	31.1
357	2.50	0.55	18.0	1263	1.90	1.15	37.7	2169	2.20	0.85	27.9
360	2.35	0.70	23.0	1266	2.20	0.85	27.9	2172	2.00	1.05	34.4
363	2.40	0.65	21.3	1269	1.95	1.10	36.1	2175	2.30	0.75	24.6
366	2.10	0.95	31.1	1272	2.05	1.00	32.8	2178	2.20	0.85	27.9
369	2.00	1.05	34.4	1275	2.00	1.05	34.4	2181	2.00	1.05	34.4
372	2.30	0.75	24.6	1278	2.05	1.00	32.8	2184	2.00	1.05	34.4
375	2.20	0.85	27.9	1281	2.00	1.05	34.4	2187	2.30	0.75	24.6
378	2.40	0.65	21.3	1284	2.10	0.95	31.1	2190	2.30	0.75	24.6
381	2.25	0.80	26.2	1287	2.25	0.80	26.2	2193	2.10	0.95	31.1
384	2.30	0.75	24.6	1290	2.10	0.95	31.1	2196	2.30	0.75	24.6
387	2.20	0.85	27.9	1293	2.05	1.00	32.8	2199	2.35	0.70	23.0
390	2.20	0.85	27.9	1296	2.00	1.05	34.4	2202	2.30	0.75	24.6
393	2.15	0.90	29.5	1299	1.90	1.15	37.7	2205	2.30	0.75	24.6
396	2.25	0.80	26.2	1302	1.90	1.15	37.7	2208	2.50	0.55	18.0
399	2.35	0.70	23.0	1305	2.15	0.90	29.5	2211	2.30	0.75	24.6
402	2.10	0.95	31.1	1308	2.10	0.95	31.1	2214	2.30	0.75	24.6
405	1.65	1.40	45.9	1311	1.90	1.15	37.7	2217	2.50	0.55	18.0
408	1.95	1.10	36.1	1314	1.90	1.15	37.7	2220	2.15	0.90	29.5
411	2.10	0.95	31.1	1317	2.25	0.80	26.2	2223	2.10	0.95	31.1
414	2.10	0.95	31.1	1320	2.10	0.95	31.1	2226	2.15	0.90	29.5
417	2.05	1.00	32.8	1323	2.05	1.00	32.8	2229	2.25	0.80	26.2

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420	2.20	0.85	27.9	1326	2.30	0.75	24.6	2232	2.10	0.95	31.1
423	2.20	0.85	27.9	1329	2.15	0.90	29.5	2235	2.35	0.70	23.0
426	2.05	1.00	32.8	1332	2.30	0.75	24.6	2238	2.35	0.70	23.0
429	2.05	1.00	32.8	1335	2.20	0.85	27.9	2241	2.25	0.80	26.2
432	2.25	0.80	26.2	1338	2.30	0.75	24.6	2244	1.90	1.15	37.7
435	2.15	0.90	29.5	1341	2.05	1.00	32.8	2247	1.85	1.20	39.3
438	2.00	1.05	34.4	1344	2.20	0.85	27.9	2250	2.20	0.85	27.9
441	2.20	0.85	27.9	1347	2.30	0.75	24.6	2253	2.35	0.70	23.0
444	2.30	0.75	24.6	1350	2.40	0.65	21.3	2256	2.40	0.65	21.3
447	2.20	0.85	27.9	1353	2.30	0.75	24.6	2259	2.25	0.80	26.2
450	2.35	0.70	23.0	1356	2.25	0.80	26.2	2262	2.20	0.85	27.9
453	2.15	0.90	29.5	1359	2.20	0.85	27.9	2265	2.05	1.00	32.8
456	2.15	0.90	29.5	1362	2.50	0.55	18.0	2268	2.10	0.95	31.1
459	2.20	0.85	27.9	1365	2.25	0.80	26.2	2271	2.15	0.90	29.5
462	2.15	0.90	29.5	1368	2.55	0.50	16.4	2274	2.20	0.85	27.9
465	2.15	0.90	29.5	1371	2.40	0.65	21.3	2277	2.40	0.65	21.3
468	2.30	0.75	24.6	1374	2.55	0.50	16.4	2280	2.35	0.70	23.0
471	2.40	0.65	21.3	1377	2.50	0.55	18.0	2283	2.20	0.85	27.9
474	2.30	0.75	24.6	1380	2.60	0.45	14.8	2286	2.15	0.90	29.5
477	2.50	0.55	18.0	1383	2.60	0.45	14.8	2289	2.05	1.00	32.8
480	2.35	0.70	23.0	1386	2.60	0.45	14.8	2292	2.05	1.00	32.8
483	2.15	0.90	29.5	1389	2.30	0.75	24.6	2295	2.05	1.00	32.8
486	2.30	0.75	24.6	1392	2.20	0.85	27.9	2298	2.10	0.95	31.1
489	2.25	0.80	26.2	1395	2.15	0.90	29.5	2301	2.25	0.80	26.2
492	2.35	0.70	23.0	1398	2.20	0.85	27.9	2304	2.20	0.85	27.9
495	2.15	0.90	29.5	1401	2.25	0.80	26.2	2307	2.45	0.60	19.7
498	2.20	0.85	27.9	1404	2.30	0.75	24.6	2310	2.30	0.75	24.6
501	2.25	0.80	26.2	1407	2.20	0.85	27.9	2313	2.30	0.75	24.6

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504	2.15	0.90	29.5	1410	2.40	0.65	21.3	2316	2.45	0.60	19.7
507	2.15	0.90	29.5	1413	2.40	0.65	21.3	2319	2.40	0.65	21.3
510	2.30	0.75	24.6	1416	2.10	0.95	31.1	2322	2.35	0.70	23.0
513	2.20	0.85	27.9	1419	2.15	0.90	29.5	2325	2.50	0.55	18.0
516	2.15	0.90	29.5	1422	2.30	0.75	24.6	2328	2.40	0.65	21.3
519	2.25	0.80	26.2	1425	2.25	0.80	26.2	2331	2.55	0.50	16.4
522	2.35	0.70	23.0	1428	2.50	0.55	18.0	2334	2.45	0.60	19.7
525	2.35	0.70	23.0	1431	2.40	0.65	21.3	2337	2.30	0.75	24.6
528	2.35	0.70	23.0	1434	2.25	0.80	26.2	2340	2.30	0.75	24.6
531	2.35	0.70	23.0	1437	2.45	0.60	19.7	2343	2.30	0.75	24.6
534	2.55	0.50	16.4	1440	2.50	0.55	18.0	2346	2.35	0.70	23.0
537	2.25	0.80	26.2	1443	2.35	0.70	23.0	2349	2.25	0.80	26.2
540	2.20	0.85	27.9	1446	2.45	0.60	19.7	2352	2.60	0.45	14.8
543	2.30	0.75	24.6	1449	2.25	0.80	26.2	2355	2.45	0.60	19.7
546	2.20	0.85	27.9	1452	2.20	0.85	27.9	2358	2.45	0.60	19.7
549	2.50	0.55	18.0	1455	2.20	0.85	27.9	2361	2.45	0.60	19.7
552	2.40	0.65	21.3	1458	2.15	0.90	29.5	2364	2.45	0.60	19.7
555	2.20	0.85	27.9	1461	2.00	1.05	34.4	2367	2.35	0.70	23.0
558	2.20	0.85	27.9	1464	2.05	1.00	32.8	2370	2.55	0.50	16.4
561	2.30	0.75	24.6	1467	2.35	0.70	23.0	2373	2.65	0.40	13.1
564	2.40	0.65	21.3	1470	2.20	0.85	27.9	2376	2.25	0.80	26.2
567	2.45	0.60	19.7	1473	2.15	0.90	29.5	2379	2.45	0.60	19.7
570	2.40	0.65	21.3	1476	2.55	0.50	16.4	2382	2.25	0.80	26.2
573	2.40	0.65	21.3	1479	2.50	0.55	18.0	2385	2.35	0.70	23.0
576	2.45	0.60	19.7	1482	2.30	0.75	24.6	2388	2.50	0.55	18.0
579	2.55	0.50	16.4	1485	2.20	0.85	27.9	2391	2.65	0.40	13.1
582	2.50	0.55	18.0	1488	2.20	0.85	27.9	2394	2.45	0.60	19.7
585	2.50	0.55	18.0	1491	2.15	0.90	29.5	2397	2.30	0.75	24.6

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588	2.25	0.80	26.2	1494	2.25	0.80	26.2	2400	2.30	0.75	24.6
591	2.25	0.80	26.2	1497	2.30	0.75	24.6	2403	2.50	0.55	18.0
594	2.30	0.75	24.6	1500	2.20	0.85	27.9	2406	2.40	0.65	21.3
597	2.20	0.85	27.9	1503	2.10	0.95	31.1	2409	2.40	0.65	21.3
600	2.35	0.70	23.0	1506	2.25	0.80	26.2	2412	2.40	0.65	21.3
603	2.45	0.60	19.7	1509	2.15	0.90	29.5	2415	2.50	0.55	18.0
606	1.90	1.15	37.7	1512	2.10	0.95	31.1	2418	2.45	0.60	19.7
609	1.95	1.10	36.1	1515	2.25	0.80	26.2	2421	2.50	0.55	18.0
612	1.90	1.15	37.7	1518	2.30	0.75	24.6	2424	2.70	0.35	11.5
615	2.00	1.05	34.4	1521	2.35	0.70	23.0	2427	2.60	0.45	14.8
618	2.00	1.05	34.4	1524	2.20	0.85	27.9	2430	2.60	0.45	14.8
621	1.90	1.15	37.7	1527	2.20	0.85	27.9	2433	2.65	0.40	13.1
624	2.00	1.05	34.4	1530	2.15	0.90	29.5	2436	2.55	0.50	16.4
627	2.05	1.00	32.8	1533	2.25	0.80	26.2	2439	2.50	0.55	18.0
630	1.85	1.20	39.3	1536	2.20	0.85	27.9	2442	2.65	0.40	13.1
633	1.90	1.15	37.7	1539	2.25	0.80	26.2	2445	2.70	0.35	11.5
636	2.10	0.95	31.1	1542	2.45	0.60	19.7	2448	2.75	0.30	9.8
639	2.20	0.85	27.9	1545	2.30	0.75	24.6	2451	2.70	0.35	11.5
642	2.20	0.85	27.9	1548	2.30	0.75	24.6	2454	2.60	0.45	14.8
645	2.40	0.65	21.3	1551	2.45	0.60	19.7	2457	2.75	0.30	9.8
648	2.20	0.85	27.9	1554	2.40	0.65	21.3	2460	2.85	0.20	6.6
651	2.25	0.80	26.2	1557	2.40	0.65	21.3	2463	2.75	0.30	9.8
654	2.10	0.95	31.1	1560	2.45	0.60	19.7	2466	2.75	0.30	9.8
657	2.50	0.55	18.0	1563	2.50	0.55	18.0	2469	2.70	0.35	11.5
660	2.30	0.75	24.6	1566	2.25	0.80	26.2	2472	2.60	0.45	14.8
663	2.54	0.51	16.7	1569	2.30	0.75	24.6	2475	2.55	0.50	16.4
666	2.40	0.65	21.3	1572	2.10	0.95	31.1	2478	2.60	0.45	14.8
669	2.25	0.80	26.2	1575	2.15	0.90	29.5	2481	2.65	0.40	13.1

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672	2.25	0.80	26.2
675	2.30	0.75	24.6
678	2.30	0.75	24.6
681	2.10	0.95	31.1
684	2.05	1.00	32.8
687	2.05	1.00	[illegible]8
690	1.95	1.10	36.1
693	2.10	0.95	31.1
696	2.05	1.00	32.8
699	2.25	0.80	26.2
702	2.35	0.70	23.0
705	2.40	0.65	21.3
708	2.15	0.90	29.5
711	2.30	0.75	24.6
714	2.10	0.95	31.1
717	2.10	0.95	31.1
720	2.05	1.00	32.8
723	2.20	0.85	27.9
726	2.25	0.80	26.2
729	2.35	0.70	23.0
732	2.20	0.85	27.9
735	2.15	0.90	29.5
738	2.00	1.05	34.4
741	2.05	1.00	32.8
744	2.00	1.05	34.4
747	1.90	1.15	37.7
750	2.20	0.85	27.9
753	2.05	1.00	32.8

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
1578	2.50	0.55	18.0
1581	2.50	0.55	18.0
1584	2.30	0.75	24.6
1587	2.15	0.90	29.5
1590	2.10	0.95	31.1
1593	2.20	0.85	27.9
1596	2.10	0.95	31.1
1599	2.40	0.65	21.3
1602	2.30	0.75	24.6
1605	2.45	0.60	19.7
1608	2.65	0.40	13.1
1611	2.50	0.55	18.0
1614	2.60	0.45	14.8
1617	2.30	0.75	24.6
1620	2.50	0.55	18.0
1623	2.50	0.55	18.0
1626	2.50	0.55	18.0
1629	2.25	0.80	26.2
1632	2.40	0.65	21.3
1635	2.35	0.70	23.0
1638	2.30	0.75	24.6
1641	2.30	0.75	24.6
1644	2.50	0.55	18.0
1647	2.40	0.65	21.3
1650	2.25	0.80	26.2
1653	2.20	0.85	27.9
1656	2.20	0.85	27.9
1659	2.10	0.95	31.1

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
2484	2.65	0.40	13.1
2487	2.75	0.30	9.8
2490	2.45	0.60	19.7
2493	2.75	0.30	9.8
2496	2.60	0.45	14.8
2499	2.65	0.40	13.1
2502	2.65	0.40	13.1
2505	2.75	0.30	9.8
2508	2.70	0.35	11.5
2511	2.65	0.40	13.1
2514	2.60	0.45	14.8
2517	2.60	0.45	14.8
2520	2.45	0.60	19.7
2523	2.60	0.45	14.8
2526	2.50	0.55	18.0
2529	2.50	0.55	18.0
2532	2.50	0.55	18.0
2535	2.40	0.65	21.3
2538	2.45	0.60	19.7
2541	2.40	0.65	21.3
2544	2.50	0.55	18.0
2547	2.50	0.55	18.0
2550	2.55	0.50	16.4
2553	2.55	0.50	16.4
2556	2.55	0.50	16.4
2559	2.65	0.40	13.1
2562	2.55	0.50	16.4
2565	2.50	0.55	18.0

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756	1.80	1.25	41.0	1662	2.20	0.85	27.9	2568	2.55	0.50	16.4
759	1.95	1.10	36.1	1665	2.15	0.90	29.5	2571	2.50	0.55	18.0
762	1.90	1.15	37.7	1668	2.05	1.00	32.8	2574	2.60	0.45	14.8
765	1.90	1.15	37.7	1671	2.05	1.00	32.8	2577	2.45	0.60	19.7
768	1.90	1.15	37.7	1674	2.20	0.85	27.9	2580	2.55	0.50	16.4
771	1.90	1.15	37.7	1677	2.25	0.80	26.2	2583	2.60	0.45	14.8
774	2.05	1.00	32.8	1680	2.25	0.80	26.2	2586	2.65	0.40	13.1
777	2.15	0.90	29.5	1683	2.20	0.85	27.9	2589	2.60	0.45	14.8
780	2.10	0.95	31.1	1686	2.05	1.00	32.8	2592	2.55	0.50	16.4
783	2.10	0.95	31.1	1689	2.25	0.80	26.2	2595	2.50	0.55	18.0
786	1.80	1.25	41.0	1692	2.25	0.80	26.2	2598	2.40	0.65	21.3
789	1.80	1.25	41.0	1695	2.30	0.75	24.6	2601	2.50	0.55	18.0
792	1.75	1.30	42.6	1698	2.15	0.90	29.5	2604	2.50	0.55	18.0
795	1.85	1.20	39.3	1701	2.20	0.85	27.9	2607	2.60	0.45	14.8
798	1.75	1.30	42.6	1704	2.30	0.75	24.6	2610	2.55	0.50	16.4
801	1.75	1.30	42.6	1707	2.25	0.80	26.2	2613	2.80	0.25	8.2
804	1.90	1.15	37.7	1710	2.20	0.85	27.9	2616	2.50	0.55	18.0
807	1.90	1.15	37.7	1713	2.20	0.85	27.9	2619	2.40	0.65	21.3
810	2.00	1.05	34.4	1716	2.25	0.80	26.2	2622	2.55	0.50	16.4
813	1.90	1.15	37.7	1719	2.15	0.90	29.5	2625	2.90	0.15	4.9
816	2.05	1.00	32.8	1722	2.15	0.90	29.5	2628	2.65	0.40	13.1
819	1.90	1.15	37.7	1725	2.20	0.85	27.9	2631	2.70	0.35	11.5
822	2.00	1.05	34.4	1728	2.20	0.85	27.9	2634	2.50	0.55	18.0
825	1.95	1.10	36.1	1731	2.40	0.65	21.3	2637	2.50	0.55	18.0
828	1.95	1.10	36.1	1734	2.40	0.65	21.3	2640	2.50	0.55	18.0
831	2.00	1.05	34.4	1737	2.50	0.55	18.0	2643	2.70	0.35	11.5
834	1.95	1.10	36.1	1740	2.50	0.55	18.0	2646	2.60	0.45	14.8
837	2.05	1.00	32.8	1743	2.20	0.85	27.9	2649	2.60	0.45	14.8

LINGAN COLLIERY
ARCH SURVEY OF 9 EAST TOP
OCTOBER 28,1987
ORIGINAL ARCH HEIGHT IS 3.05 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
840	2.20	0.85	27.9
843	1.85	1.20	39.3
846	1.85	1.20	39.3
849	1.85	1.20	39.3
852	1.90	1.15	37.7
855	1.85	1.20	39.3
858	1.90	1.15	37.7
861	1.90	1.15	37.7
864	2.05	1.00	32.8
867	2.00	1.05	34.4
870	2.10	0.95	31.1
873	2.10	0.95	31.1
876	2.20	0.85	27.9
879	2.05	1.00	32.8
882	2.15	0.90	29.5
885	1.95	1.10	36.1
888	2.15	0.90	29.5
891	1.95	1.10	36.1
894	2.10	0.95	31.1
897	1.95	1.10	36.1
900	2.00	1.05	34.4
903	2.00	1.05	34.4

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
1746	2.15	0.90	29.5
1749	2.20	0.85	27.9
1752	2.15	0.90	29.5
1755	2.05	1.00	32.8
1758	2.20	0.85	27.9
1761	2.10	0.95	31.1
1764	2.10	0.95	31.1
1767	2.30	0.75	24.6
1770	2.30	0.75	24.6
1773	2.45	0.60	19.7
1776	2.35	0.70	23.0
1779	2.10	0.95	31.1
1782	2.30	0.75	24.6
1785	2.25	0.80	26.2
1788	2.30	0.75	24.6
1791	2.35	0.70	23.0
1794	2.40	0.65	21.3
1797	2.45	0.60	19.7
1800	2.45	0.60	19.7
1803	2.45	0.60	19.7
1806	2.50	0.55	18.0
1809	2.60	0.45	14.8

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
2652	2.60	0.45	14.8
2655	2.65	0.40	13.1
2658	2.45	0.60	19.7
2661	2.45	0.60	19.7
2664	2.55	0.50	16.4
2667	2,45	0.60	19.7
2670	2.60	0.45	14.8
2673	2.55	0.50	16.4
2676	2.60	0.45	14.8
2679	2.60	0.45	14.8
2682	2.55	0.50	16.4
2685	2.55	0.50	16.4
2688	2.65	0.40	13.1
2691	2.70	0.35	11.5
2694	2.80	0.25	8.2
2697	2.85	0.20	6.6
2700	2.70	0.35	11.5
2703	2.75	0.30	9.8
2706	2.90	0.15	4.9
2709	2.80	0.25	8.2
2712	2.74	0.31	10.2
2715	2.90	0.15	4.9
2718	2.95	0.10	3.3

APPENDIX B

9 East Bottom Level

LINGAN COLLIERY
ARCH SURVEY OF 9 EAST BOTTOM
SEPTEMBER 23,1987
ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
0	2.00	1.35	40.3	879	2.00	1.35	40.3	1758	2.35	1.00	29.9
3	2.00	1.35	40.3	882	2.05	1.30	38.8	1761	2.60	0.75	22.4
6	1.90	1.45	43.3	885	2.00	1.35	40.3	1764	2.29	1.06	31.6
9	1.85	1.50	44.8	888	2.25	1.10	32.8	1767	2.72	0.63	18.8
12	1.80	1.55	46.3	891	2.15	1.20	35.8	1770	2.40	0.95	28.4
15	2.20	1.15	34.3	894	2.35	1.00	29.9	1773	2.72	0.63	18.8
18	2.80	0.55	16.4	897	2.40	0.95	28.4	1776	2.40	0.95	28.4
21	2.90	0.45	13.4	900	2.20	1.15	34.3	1779	2.55	0.80	23.9
24	2.70	0.65	19.4	903	2.25	1.10	32.8	1782	2.53	0.82	24.5
27	2.55	0.80	23.9	906	2.20	1.15	34.3	1785	2.79	0.56	16.7
30	2.45	0.90	26.9	909	2.20	1.15	34.3	1788	2.70	0.65	19.4
33	2.55	0.80	23.9	912	2.00	1.35	40.3	1791	2.87	0.48	14.3
36	2.70	0.65	19.4	915	2.15	1.20	35.8	1794	2.62	0.73	21.8
39	2.60	0.75	22.4	918	2.20	1.15	34.3	1797	2.48	0.87	26.0
42	2.70	0.65	19.4	921	2.30	1.05	31.3	1800	2.44	0.91	27.2
45	2.80	0.55	16.4	924	2.40	0.95	28.4	1803	2.62	0.73	21.8
48	2.75	0.60	17.9	927	2.40	0.95	28.4	1806	2.34	1.01	30.1
51	2.75	0.60	17.9	930	2.25	1.10	32.8	1809	2.53	0.82	24.5
54	2.70	0.65	19.4	933	2.25	1.10	32.8	1812	2.27	1.08	32.2
57	2.70	0.65	19.4	936	2.05	1.30	38.8	1815	2.55	0.80	23.9
60	2.75	0.60	17.9	939	1.95	1.40	41.8	1818	2.47	0.88	26.3
63	2.65	0.70	20.9	942	1.90	1.45	43.3	1821	2.65	0.70	20.9
66	2.60	0.75	22.4	945	1.90	1.45	43.3	1824	2.46	0.89	26.6
69	2.70	0.65	19.4	948	1.85	1.50	44.8	1827	2.67	0.68	20.3
72	2.80	0.55	16.4	951	2.00	1.35	40.3	1830	2.60	0.75	22.4
75	2.65	0.70	20.9	954	2.00	1.35	40.3	1833	2.74	0.61	18.2
78	2.65	0.70	20.9	957	2.35	1.00	29.9	1836	2.61	0.74	22.1
81	2.65	0.70	20.9	960	2.45	0.90	26.9	1839	2.58	0.77	23.0

LINGAN COLLIERY
ARCH SURVEY OF 9 EAST BOTTOM
SEPTEMBER 23,1987
ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
84	2.60	0.75	22.4	963	2.10	1.25	37.3	1842	2.68	0.67	20.0
87	2.70	0.65	19.4	966	2.05	1.30	38.8	1845	2.74	0.61	18.2
90	2.60	0.75	22.4	969	1.90	1.45	43.3	1848	2.74	0.61	18.2
93	2.70	0.65	19.4	972	1.95	1.40	41.8	1851	2.70	0.65	19.4
96	2.60	0.75	22.4	975	2.15	1.20	35.8	1854	2.60	0.75	22.4
99	2.70	0.65	19.4	978	2.20	1.15	34.3	1857	2.53	0.82	24.5
102	2.60	0.75	22.4	981	2.20	1.15	34.3	1860	2.50	0.85	25.4
105	2.60	0.75	22.4	984	2.00	1.35	40.3	1863	2.32	1.03	30.7
108	2.65	0.70	20.9	987	1.90	1.45	43.3	1866	2.23	1.12	33.4
111	2.60	0.75	22.4	990	1.80	1.55	46.3	1869	2.02	1.33	39.7
114	2.60	0.75	22.4	993	1.70	1.65	49.3	1872	2.00	1.35	40.3
117	2.50	0.85	25.4	996	1.70	1.65	49.3	1875	2.36	0.99	29.6
120	2.55	0.80	23.9	999	1.80	1.55	46.3	1878	2.27	1.08	32.2
123	2.60	0.75	22.4	1002	2.05	1.30	38.8	1881	2.34	1.01	30.1
126	2.80	0.55	16.4	1005	2.10	1.25	37.3	1884	2.30	1.05	31.3
129	2.80	0.55	16.4	1008	2.00	1.35	40.3	1887	2.25	1.10	32.8
132	2.70	0.65	19.4	1011	2.00	1.35	40.3	1890	1.98	1.37	40.9
135	2.65	0.70	20.9	1014	1.90	1.45	43.3	1893	2.40	0.95	28.4
138	2.50	0.85	25.4	1017	2.00	1.35	40.3	1896	2.22	1.13	33.7
141	2.45	0.90	26.9	1020	1.95	1.40	41.8	1899	2.24	1.11	33.1
144	2.50	0.85	25.4	1023	2.10	1.25	37.3	1902	2.30	1.05	31.3
147	2.50	0.85	25.4	1026	2.00	1.35	40.3	1905	2.37	0.98	29.3
150	2.35	1.00	29.9	1029	2.15	1.20	35.8	1908	2.42	0.93	27.8
153	2.45	0.90	26.9	1032	2.15	1.20	35.8	1911	2.41	0.94	28.1
156	2.30	1.05	31.3	1035	2.20	1.15	34.3	1914	2.34	1.01	30.1
159	2.40	0.95	28.4	1038	2.10	1.25	37.3	1917	2.22	1.13	33.7
162	2.30	1.05	31.3	1041	2.05	1.30	38.8	1920	2.32	1.03	30.7
165	2.20	1.15	34.3	1044	2.20	1.15	34.3	1923	2.50	0.85	25.4

LINGAN COLLIERY
ARCH SURVEY OF 9 EAST BOTTOM
SEPTEMBER 23,1987
ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
168	2.20	1.15	34.3	1047	2.10	1.25	37.3	1926	2.53	0.82	24.5
171	2.20	1.15	34.3	1050	2.05	1.30	38.8	1929	2.54	0.81	24.2
174	2.40	0.95	28.4	1053	1.90	1.45	43.3	1932	2.48	0.87	26.0
177	2.45	0.90	26.9	1056	2.05	1.30	38.8	1935	2.62	0.73	21.8
180	2.50	0.85	25.4	1059	2.10	1.25	37.3	1938	2.48	0.87	26.0
183	2.50	0.85	25.4	1062	1.85	1.50	44.8	1941	2.41	0.94	28.1
186	2.45	0.90	26.9	1065	1.70	1.65	49.3	1944	2.30	1.05	31.3
189	2.60	0.75	22.4	1068	1.80	1.55	46.3	1947	2.28	1.07	31.9
192	2.50	0.85	25.4	1071	1.95	1.40	41.8	1950	2.17	1.18	35.2
195	2.45	0.90	26.9	1074	1.85	1.50	44.8	1953	2.10	1.25	37.3
198	2.40	0.95	28.4	1077	1.80	1.55	46.3	1956	2.38	0.97	29.0
201	2.60	0.75	22.4	1080	1.80	1.55	46.3	1959	2.35	1.00	29.9
204	2.65	0.70	20.9	1083	1.90	1.45	43.3	1962	2.19	1.16	34.6
207	2.70	0.65	19.4	1086	1.80	1.55	46.3	1965	2.29	1.06	31.6
210	2.65	0.70	20.9	1089	2.00	1.35	40.3	1968	2.30	1.05	31.3
213	2.45	0.90	26.9	1092	2.05	1.30	38.8	1971	2.00	1.35	40.3
216	2.55	0.80	23.9	1095	2.05	1.30	38.8	1974	2.18	1.17	34.9
219	2.60	0.75	22.4	1098	2.05	1.30	38.8	1977	2.13	1.22	36.4
222	2.55	0.80	23.9	1101	1.95	1.40	41.8	1980	2.12	1.23	36.7
225	2.55	0.80	23.9	1104	1.75	1.60	47.8	1983	2.10	1.25	37.3
228	2.45	0.90	26.9	1107	1.95	1.40	41.8	1986	2.31	1.04	31.0
231	2.45	0.90	26.9	1110	2.25	1.10	32.8	1989	2.31	1.04	31.0
234	2.50	0.85	25.4	1113	2.05	1.30	38.8	1992	2.42	0.93	27.8
237	2.50	0.85	25.4	1116	2.15	1.20	35.8	1995	2.46	0.89	26.6
240	2.65	0.70	20.9	1119	2.30	1.05	31.3	1998	2.21	1.14	34.0
243	2.55	0.80	23.9	1122	2.15	1.20	35.8	2001	2.42	0.93	27.8
246	2.60	0.75	22.4	1125	2.35	1.00	29.9	2004	2.47	0.88	26.3
249	2.55	0.80	23.9	1128	2.25	1.10	32.8	2007	2.60	0.75	22.4

LINGAN COLLIERY
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ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
252	2.65	0.70	20.9	1131	2.15	1.20	35.8	2010	2.18	1.17	34.9
255	2.75	0.60	17.9	1134	2.15	1.20	35.8	2013	2.28	1.07	31.9
258	2.60	0.75	22.4	1137	2.25	1.10	32.8	2016	2.41	0.94	28.1
261	2.55	0.80	23.9	1140	2.30	1.05	31.3	2019	2.45	0.90	26.9
264	2.60	0.75	22.4	1143	2.25	1.10	32.8	2022	2.28	1.07	31.9
267	2.60	0.75	22.4	1146	2.10	1.25	37.3	2025	2.58	0.77	23.0
270	2.60	0.75	22.4	1149	2.20	1.15	34.3	2028	2.51	0.84	25.1
273	2.60	0.75	22.4	1152	2.20	1.15	34.3	2031	2.50	0.85	25.4
276	2.45	0.90	26.9	1155	2.30	1.05	31.3	2034	2.54	0.81	24.2
279	2.60	0.75	22.4	1158	2.15	1.20	35.8	2037	2.41	0.94	28.1
282	2.25	1.10	32.8	1161	2.25	1.10	32.8	2040	2.32	1.03	30.7
285	2.15	1.20	35.8	1164	2.20	1.15	34.3	2043	2.50	0.85	25.4
288	2.25	1.10	32.8	1167	2.25	1.10	32.8	2046	2.30	1.05	31.3
291	2.50	0.85	25.4	1170	2.15	1.20	35.8	2049	2.48	0.87	26.0
294	2.35	1.00	29.9	1173	2.40	0.95	28.4	2052	2.42	0.93	27.8
297	2.40	0.95	28.4	1176	2.10	1.25	37.3	2055	2.59	0.76	22.7
300	2.60	0.75	22.4	1179	2.10	1.25	37.3	2058	2.56	0.79	23.6
303	2.50	0.85	25.4	1182	2.20	1.15	34.3	2061	2.61	0.74	22.1
306	2.45	0.90	26.9	1185	2.20	1.15	34.3	2064	2.63	0.72	21.5
309	2.45	0.90	26.9	1188	2.15	1.20	35.8	2067	2.55	0.80	23.9
312	2.40	0.95	28.4	1191	2.25	1.10	32.8	2070	2.40	0.95	28.4
315	2.45	0.90	26.9	1194	2.10	1.25	37.3	2073	2.62	0.73	21.8
318	2.55	0.80	23.9	1197	2.20	1.15	34.3	2076	2.37	0.98	29.3
321	2.45	0.90	26.9	1200	2.10	1.25	37.3	2079	2.58	0.77	23.0
324	2.25	1.10	32.8	1203	2.15	1.20	35.8	2082	2.45	0.90	26.9
327	2.35	1.00	29.9	1206	2.40	0.95	28.4	2085	2.52	0.83	24.8
330	2.15	1.20	35.8	1209	2.50	0.85	25.4	2088	2.40	0.95	28.4
333	2.10	1.25	37.3	1212	2.55	0.80	23.9	2091	2.50	0.85	25.4

LINGAN COLLIERY
ARCH SURVEY OF 9 EAST BOTTOM
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ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
336	2.20	1.15	34.3	1215	2.30	1.05	31.3	2094	2.56	0.79	23.6
339	2.25	1.10	32.8	1218	2.35	1.00	29.9	2097	2.57	0.78	23.3
342	2.15	1.20	35.8	1221	2.30	1.05	31.3	2100	2.45	0.90	26.9
345	2.20	1.15	34.3	1224	2.20	1.15	34.3	2103	2.49	0.86	25.7
348	2.20	1.15	34.3	1227	2.45	0.90	26.9	2106	2.20	1.15	34.3
351	2.15	1.20	35.8	1230	2.35	1.00	29.9	2109	2.20	1.15	34.3
354	2.15	1.20	35.8	1233	2.45	0.90	26.9	2112	2.16	1.19	35.5
357	2.20	1.15	34.3	1236	2.30	1.05	31.3	2115	2.56	0.79	23.6
360	2.15	1.20	35.8	1239	2.20	1.15	34.3	2118	2.56	0.79	23.6
363	1.95	1.40	41.8	1242	2.20	1.15	34.3	2121	2.46	0.89	26.6
366	2.00	1.35	40.3	1245	2.20	1.15	34.3	2124	2.33	1.02	30.4
369	2.10	1.25	37.3	1248	2.30	1.05	31.3	2127	2.13	1.22	36.4
372	1.95	1.40	41.8	1251	2.25	1.10	32.8	2130	2.22	1.13	33.7
375	2.20	1.15	34.3	1254	2.20	1.15	34.3	2133	2.23	1.12	33.4
378	2.05	1.30	38.8	1257	2.25	1.10	32.8	2136	2.15	1.20	35.8
381	2.15	1.20	35.8	1260	2.15	1.20	35.8	2139	1.95	1.40	41.8
384	2.20	1.15	34.3	1263	2.05	1.30	38.8	2142	1.99	1.36	40.6
387	2.05	1.30	38.8	1266	2.00	1.35	40.3	2145	2.17	1.18	35.2
390	2.20	1.15	34.3	1269	2.00	1.35	40.3	2148	2.42	0.93	27.8
393	2.00	1.35	40.3	1272	2.10	1.25	37.3	2151	2.10	1.25	37.3
396	2.05	1.30	38.8	1275	2.35	1.00	29.9	2154	2.10	1.25	37.3
399	2.20	1.15	34.3	1278	2.25	1.10	32.8	2157	2.02	1.33	39.7
402	2.15	1.20	35.8	1281	2.25	1.10	32.8	2160	2.16	1.19	35.5
405	2.20	1.15	34.3	1284	2.30	1.05	31.3	2163	2.15	1.20	35.8
408	2.20	1.15	34.3	1287	2.15	1.20	35.8	2166	2.30	1.05	31.3
411	2.20	1.15	34.3	1290	2.10	1.25	37.3	2169	2.31	1.04	31.0
414	2.35	1.00	29.9	1293	2.15	1.20	35.8	2172	2.23	1.12	33.4
417	2.25	1.10	32.8	1296	2.30	1.05	31.3	2175	2.17	1.18	35.2

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ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
420	2.30	1.05	31.3	1299	2.35	1.00	29.9	2178	2.26	1.09	32.5
423	2.15	1.20	35.8	1302	2.06	1.29	38.5	2181	2.00	1.35	40.3
426	2.25	1.10	32.8	1305	2.19	1.16	34.6	2184	2.53	0.82	24.5
429	2.20	1.15	34.3	1308	2.03	1.32	39.4	2187	2.60	0.75	22.4
432	2.25	1.10	32.8	1311	1.97	1.38	41.2	2190	2.60	0.75	22.4
435	2.25	1.10	32.8	1314	1.83	1.52	45.4	2193	2.73	0.62	18.5
438	2.45	0.90	26.9	1317	1.80	1.55	46.3	2196	2.60	0.75	22.4
441	2.45	0.90	26.9	1320	1.93	1.42	42.4	2199	2.38	0.97	29.0
444	2.50	0.85	25.4	1323	1.89	1.46	43.6	2202	2.51	0.84	25.1
447	2.50	0.85	25.4	1326	2.19	1.16	34.6	2205	2.45	0.90	26.9
450	2.45	0.90	26.9	1329	2.04	1.31	39.1	2208	2.31	1.04	31.0
453	2.40	0.95	28.4	1332	1.97	1.38	41.2	2211	2.33	1.02	30.4
456	2.30	1.05	31.3	1335	1.88	1.47	43.9	2214	2.46	0.89	26.6
459	2.35	1.00	29.9	1338	1.90	1.45	43.3	2217	2.13	1.22	36.4
462	2.50	0.85	25.4	1341	1.97	1.38	41.2	2220	2.10	1.25	37.3
465	2.40	0.95	28.4	1344	2.06	1.29	38.5	2223	2.04	1.31	39.1
468	2.35	1.00	29.9	1347	2.12	1.23	36.7	2226	2.06	1.29	38.5
471	2.50	0.85	25.4	1350	1.96	1.39	41.5	2229	1.95	1.40	41.8
474	2.55	0.80	23.9	1353	2.27	1.08	32.2	2232	1.90	1.45	43.3
477	2.60	0.75	22.4	1356	2.20	1.15	34.3	2235	2.00	1.35	40.3
480	2.65	0.70	20.9	1359	2.07	1.28	38.2	2238	2.15	1.20	35.8
483	2.50	0.85	25.4	1362	2.17	1.18	35.2	2241	2.29	1.06	31.6
486	2.50	0.85	25.4	1365	2.29	1.06	31.6	2244	2.56	0.79	23.6
489	2.45	0.90	26.9	1368	2.10	1.25	37.3	2247	2.39	0.96	28.7
492	2.35	1.00	29.9	1371	2.00	1.35	40.3	2250	2.34	1.01	30.1
495	2.30	1.05	31.3	1374	2.13	1.22	36.4	2253	2.51	0.84	25.1
498	2.15	1.20	35.8	1377	1.98	1.37	40.9	2256	2.30	1.05	31.3
501	2.15	1.20	35.8	1380	2.16	1.19	35.5	2259	2.37	0.98	29.3

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504	2.15	1.20	35.8	1383	1.94	1.41	42.1	2262	2.30	1.05	31.3
507	2.10	1.25	37.3	1386	2.24	1.11	33.1	2265	2.14	1.21	36.1
510	2.25	1.10	32.8	1389	2.12	1.23	36.7	2268	2.26	1.09	32.5
513	2.20	1.15	34.3	1392	2.40	0.95	28.4	2271	2.22	1.13	33.7
516	2.20	1.15	34.3	1395	2.29	1.06	31.6	2274	2.23	1.12	33.4
519	2.15	1.20	35.8	1398	2.15	1.20	35.8	2277	2.28	1.07	32.0
522	2.20	1.15	34.3	1401	2.20	1.15	34.3	2280	2.53	0.82	24.5
525	2.25	1.10	32.8	1404	1.98	1.37	40.9	2283	2.51	0.84	25.1
528	2.20	1.15	34.3	1407	2.15	1.20	35.8	2286	2.67	0.68	20.3
531	2.30	1.05	31.3	1410	2.30	1.05	31.3	2289	2.63	0.72	21.5
534	2.10	1.25	37.3	1413	2.02	1.33	39.7	2292	2.72	0.63	18.8
537	1.85	1.50	44.8	1416	2.20	1.15	34.3	2295	2.45	0.90	26.9
540	2.10	1.25	37.3	1419	1.97	1.38	41.2	2298	2.64	0.71	21.2
543	2.05	1.30	38.8	1422	1.99	1.36	40.6	2301	2.32	1.03	30.7
546	2.15	1.20	35.8	1425	2.15	1.20	35.8	2304	2.43	0.92	27.5
549	1.95	1.40	41.8	1428	1.78	1.57	46.9	2307	2.50	0.85	25.4
552	1.95	1.40	41.8	1431	2.16	1.19	35.5	2310	2.54	0.81	24.2
555	2.00	1.35	40.3	1434	1.84	1.51	45.1	2313	2.31	1.04	31.0
558	2.15	1.20	35.8	1437	1.80	1.55	46.3	2316	2.27	1.08	32.2
561	2.05	1.30	38.8	1440	2.00	1.35	40.3	2319	2.12	1.23	36.7
564	2.25	1.10	32.8	1443	2.13	1.22	36.4	2322	2.32	1.03	30.7
567	2.35	1.00	29.9	1446	2.11	1.24	37.0	2325	2.10	1.25	37.3
570	2.40	0.95	28.4	1449	2.02	1.33	39.7	2328	2.30	1.05	31.3
573	2.35	1.00	29.9	1452	2.21	1.14	34.0	2331	2.19	1.16	34.6
576	2.20	1.15	34.3	1455	2.43	0.92	27.5	2334	2.55	0.80	23.9
579	2.15	1.20	35.8	1458	2.30	1.05	31.3	2337	2.26	1.09	32.5
582	2.10	1.25	37.3	1461	2.10	1.25	37.3	2340	2.44	0.91	27.2
585	2.40	0.95	28.4	1464	2.05	1.30	38.8	2343	2.49	0.86	25.7

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588	2.35	1.00	29.9	1467	2.10	1.25	37.3	2346	2.45	0.90	26.9
591	2.20	1.15	34.3	1470	2.15	1.20	35.8	2349	2.39	0.96	28.7
594	2.10	1.25	37.3	1473	2.40	0.95	28.4	2352	2.48	0.87	26.0
597	2.20	1.15	34.3	1476	2.15	1.20	35.8	2355	2.36	0.99	29.6
600	2.35	1.00	29.9	1479	2.28	1.07	31.9	2358	2.55	0.80	23.9
603	2.35	1.00	29.9	1482	2.42	0.93	27.8	2361	2.53	0.82	24.5
606	2.35	1.00	29.9	1485	2.27	1.08	32.2	2364	2.48	0.87	26.0
609	2.40	0.95	28.4	1488	2.26	1.09	32.5	2367	2.39	0.96	28.7
612	2.15	1.20	35.8	1491	2.30	1.05	31.3	2370	2.42	0.93	27.8
615	2.35	1.00	29.9	1494	2.24	1.11	33.1	2373	2.35	1.00	29.9
618	2.30	1.05	31.3	1497	2.35	1.00	29.9	2376	2.63	0.72	21.5
621	2.25	1.10	32.8	1500	2.46	0.89	26.6	2379	2.60	0.75	22.4
624	2.25	1.10	32.8	1503	2.37	0.98	29.3	2382	2.40	0.95	28.4
627	2.20	1.15	34.3	1506	2.27	1.08	32.2	2385	2.45	0.90	26.9
630	2.35	1.00	29.9	1509	2.45	0.90	26.9	2388	2.42	0.93	27.8
633	2.35	1.00	29.9	1512	2.32	1.03	30.7	2391	2.27	1.08	32.2
636	2.25	1.10	32.8	1515	2.12	1.23	36.7	2394	2.40	0.95	28.4
639	2.30	1.05	31.3	1518	2.21	1.14	34.0	2397	2.14	1.21	36.1
642	2.25	1.10	32.8	1521	2.07	1.28	38.2	2400	2.30	1.05	31.3
645	2.20	1.15	34.3	1524	1.99	1.36	40.6	2403	2.43	0.92	27.5
648	2.30	1.05	31.3	1527	2.11	1.24	37.0	2406	2.50	0.85	25.4
651	2.20	1.15	34.3	1530	2.13	1.22	36.4	2409	2.47	0.89	26.4
654	2.15	1.20	35.8	1533	2.16	1.19	35.5	2412	2.31	1.04	31.0
657	2.30	1.05	31.3	1536	2.02	1.33	39.7	2415	2.25	1.10	32.8
660	2.20	1.15	34.3	1539	1.86	1.49	44.5	2418	2.40	0.95	28.4
663	2.35	1.00	29.9	1542	2.01	1.34	40.0	2421	2.52	0.83	24.8
666	2.45	0.90	26.9	1545	2.10	1.25	37.3	2424	2.65	0.70	20.9
669	2.30	1.05	31.3	1548	2.16	1.19	35.5	2427	2.69	0.66	19.7

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672	2.15	1.20	35.8	1551	2.20	1.15	34.3	2430	2.60	0.75	22.4
675	2.20	1.15	34.3	1554	1.95	1.40	41.8	2433	2.40	0.95	28.4
678	2.30	1.05	31.3	1557	2.08	1.27	37.9	2436	2.37	0.98	29.3
681	2.45	0.90	26.9	1560	2.10	1.25	37.3	2439	2.27	1.08	32.2
684	2.35	1.00	29.9	1563	2.01	1.34	40.0	2442	2.41	0.94	28.1
687	2.25	1.10	32.8	1566	1.98	1.37	40.9	2445	2.20	1.15	34.3
690	2.00	1.35	40.3	1569	1.96	1.39	41.5	2448	2.17	1.18	35.2
693	2.00	1.35	40.3	1572	1.77	1.58	47.2	2451	2.19	1.16	34.6
696	2.15	1.20	35.8	1575	1.74	1.61	48.1	2454	2.33	1.02	30.4
699	2.00	1.35	40.3	1578	1.64	1.71	51.0	2457	2.55	0.80	23.9
702	2.05	1.30	38.8	1581	1.74	1.61	48.1	2460	2.61	0.74	22.1
705	2.05	1.30	38.8	1584	1.62	1.73	51.6	2463	2.60	0.75	22.4
708	2.00	1.35	40.3	1587	1.75	1.60	47.8	2466	2.69	0.66	19.7
711	1.95	1.40	41.8	1590	1.83	1.52	45.4	2469	2.34	1.01	30.1
714	2.10	1.25	37.3	1593	1.98	1.37	40.9	2472	2.36	0.99	29.6
717	2.15	1.20	35.8	1596	1.99	1.36	40.6	2475	2.24	1.11	33.1
720	2.30	1.05	31.3	1599	2.18	1.17	34.9	2478	2.28	1.07	31.9
723	2.15	1.20	35.8	1602	2.13	1.22	36.4	2481	2.52	0.83	24.8
726	2.30	1.05	31.3	1605	2.42	0.93	27.8	2484	2.75	0.60	17.9
729	2.10	1.25	37.3	1608	2.28	1.07	31.9	2487	2.44	0.91	27.2
732	2.25	1.10	32.8	1611	2.30	1.05	31.3	2490	2.33	1.02	30.4
735	2.20	1.15	34.3	1614	2.14	1.21	36.1	2493	2.00	1.35	40.3
738	2.15	1.20	35.8	1617	2.30	1.05	31.3	2496	2.10	1.25	37.3
741	2.10	1.25	37.3	1620	2.31	1.04	31.0	2499	2.23	1.12	33.4
744	2.00	1.35	40.3	1623	2.20	1.15	34.3	2502	2.25	1.10	32.8
747	2.10	1.25	37.3	1626	2.18	1.17	34.9	2505	2.29	1.06	31.6
750	2.10	1.25	37.3	1629	2.10	1.25	37.3	2508	2.10	1.25	37.3
753	2.30	1.05	31.3	1632	2.31	1.04	31.0	2511	2.10	1.25	37.3

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756	2.45	0.90	26.9	1635	2.30	1.05	31.3	2514	2.35	1.00	29.9
759	2.35	1.00	29.9	1638	2.24	1.11	33.1	2517	2.41	0.94	28.1
762	2.25	1.10	32.8	1641	2.11	1.24	37.0	2520	2.56	0.79	23.6
765	2.15	1.20	35.8	1644	2.27	1.08	32.2	2523	2.70	0.65	19.4
768	2.15	1.20	35.8	1647	2.40	0.95	28.4	2526	2.52	0.83	24.8
771	2.05	1.30	38.8	1650	2.41	0.94	28.1	2529	2.80	0.55	16.4
774	2.15	1.20	35.8	1653	2.20	1.15	34.3	2532	2.93	0.42	12.5
777	2.10	1.25	37.3	1656	2.40	0.95	28.4	2535	2.56	0.79	23.6
780	2.10	1.25	37.3	1659	2.46	0.89	26.6	2538	2.52	0.83	24.8
783	2.10	1.25	37.3	1662	2.48	0.87	26.0	2541	2.30	1.05	31.3
786	2.10	1.25	37.3	1665	2.72	0.63	18.8	2544	2.45	0.90	26.9
789	2.10	1.25	37.3	1668	2.58	0.77	23.0	2547	2.67	0.68	20.3
792	2.05	1.30	38.8	1671	2.50	0.85	25.4	2550	2.76	0.59	17.6
795	2.10	1.25	37.3	1674	2.33	1.02	30.4	2553	2.65	0.70	20.9
798	1.95	1.40	41.8	1677	2.55	0.80	23.9	2556	2.77	0.58	17.3
801	2.10	1.25	37.3	1680	2.49	0.86	25.7	2559	2.60	0.75	22.4
804	2.05	1.30	38.8	1683	2.60	0.75	22.4	2562	2.74	0.61	18.2
807	2.15	1.20	35.8	1686	2.52	0.83	24.8	2565	2.70	0.65	19.4
810	2.00	1.35	40.3	1689	2.40	0.95	28.4	2568	2.90	0.45	13.4
813	2.00	1.35	40.3	1692	2.38	0.97	29.0	2571	2.71	0.64	19.1
816	1.95	1.40	41.8	1695	2.31	1.04	31.0	2574	2.90	0.45	13.4
819	2.15	1.20	35.8	1698	2.36	0.99	29.6	2577	2.61	0.74	22.1
822	2.10	1.25	37.3	1701	2.51	0.84	25.1	2580	[illegible].00	0.35	10.4
825	1.95	1.40	41.8	1704	2.44	0.91	27.2	2583	[illegible].17	0.18	5.4
828	1.80	1.55	46.3	1707	2.38	0.97	29.0	2586	[illegible].23	0.12	3.6
831	1.80	1.55	46.3	1710	2.27	1.08	32.2	2589	3.14	0.21	6.3
834	1.95	1.40	41.8	1713	2.47	0.88	26.3	2592	3.30	0.05	1.5
837	1.90	1.45	43.3	1716	2.66	0.69	20.6	2595	3.07	0.28	8.4

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840	1.90	1.45	43.3
843	1.95	1.40	41.8
846	2.10	1.25	37.3
849	2.05	1.30	38.8
852	1.95	1.40	41.8
855	1.85	1.50	44.8
858	2.05	1.30	38.8
861	2.05	1.30	38.8
864	2.20	1.15	34.3
867	1.90	1.45	43.3
870	2.10	1.25	37.3
873	2.15	1.20	35.8
876	2.05	1.30	38.8

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
1719	2.75	0.60	17.9
1722	2.51	0.84	25.1
1725	2.70	0.65	19.4
1728	2.66	0.69	20.6
1731	2.70	0.65	19.4
1734	2.70	0.65	19.4
1737	2.78	0.57	17.0
1740	2.65	0.70	20.9
1743	2.68	0.67	20.0
1746	2.75	0.60	17.9
1749	2.56	0.79	23.6
1752	2.33	1.02	30.4
1755	2.47	0.88	26.3

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
2598	3.20	0.15	4.5
2601	3.00	0.35	10.4
2604	3.06	0.29	8.7
2607	3.00	0.35	10.4
2610	3.10	0.25	7.5
2613	3.10	0.25	7.5
2616	3.20	0.15	4.5
2619	3.15	0.20	6.0
2622	3.10	0.25	7.5
2625	3.15	0.20	6.0
2628	3.15	0.20	6.0
2631	3.30	0.05	1.5
2634	3.23	0.12	3.6

APPENDIX C

10 East Top Level

LINGAN COLLIERY
ARCH SURVEY OF 10 EAST TOP
NOVEMBER 20,1987
ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
0	3.20	0.15	4.5	564	2.70	0.65	19.4	1128	2.97	0.38	11.3
3	3.30	0.05	1.5	567	2.74	0.61	18.2	1131	2.90	0.45	13.4
6	3.35	0.00	0.0	570	2.67	0.68	20.3	1134	2.89	0.46	13.7
9	3.35	0.00	0.0	573	2.73	0.62	18.5	1137	2.80	0.55	16.4
12	3.28	0.07	2.1	576	2.60	0.75	22.4	1140	2.80	0.55	16.4
15	3.35	0.00	0.0	579	2.58	0.77	23.0	1143	2.90	0.45	13.4
18	3.35	0.00	0.0	582	2.52	0.83	24.8	1146	2.77	0.58	17.3
21	3.33	0.02	0.6	585	2.73	0.62	18.5	1149	2.74	0.61	18.2
24	3.35	0.00	0.0	588	2.53	0.82	24.5	1152	2.88	0.47	14.0
27	3.15	0.20	6.0	591	2.47	0.88	26.3	1155	2.64	0.71	21.2
30	3.20	0.15	4.5	594	2.60	0.75	22.4	1158	2.68	0.67	20.0
33	3.17	0.18	5.4	597	2.50	0.85	25.4	1161	2.66	0.69	20.6
36	3.24	0.11	3.3	600	2.56	0.79	23.6	1164	2.58	0.77	23.0
39	3.23	0.12	3.6	603	2.56	0.79	23.6	1167	2.76	0.59	17.6
42	3.26	0.09	2.7	606	2.62	0.73	21.8	1170	2.60	0.75	22.4
45	3.35	0.00	0.0	609	2.59	0.76	22.7	1173	2.40	0.95	28.4
48	3.12	0.23	6.9	612	2.49	0.86	25.7	1176	2.41	0.94	28.1
51	3.30	0.05	1.5	615	2.46	0.89	26.6	1179	2.50	0.85	25.4
54	3.35	0.00	0.0	618	2.39	0.96	28.7	1182	2.58	0.77	23.0
57	3.35	0.00	0.0	621	2.51	0.84	25.1	1185	2.50	0.85	25.4
60	3.26	0.09	2.7	624	2.35	1.00	29.9	1188	2.58	0.77	23.0
63	3.06	0.29	8.7	627	2.34	1.01	30.1	1191	2.50	0.85	25.4
66	3.21	0.14	4.2	630	2.63	0.72	21.5	1194	2.65	0.70	20.9
69	3.07	0.28	8.4	633	2.65	0.70	20.9	1197	2.50	0.85	25.4
72	2.85	0.50	14.9	636	2.57	0.78	23.3	1200	2.52	0.83	24.8
75	2.68	0.67	20.0	639	2.66	0.69	20.6	1203	2.40	0.95	28.4
78	2.81	0.54	16.1	642	2.45	0.90	26.9	1206	2.42	0.93	27.8
81	2.67	0.68	20.3	645	2.54	0.81	24.2	1209	2.40	0.95	28.4

LINGAN COLLIERY
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ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
84	2.71	0.64	19.1
87	2.40	0.95	28.4
90	2.47	0.88	26.3
93	2.57	0.78	23.3
96	2.55	0.80	23.9
99	2.48	0.87	26.0
102	2.52	0.83	24.8
105	2.37	0.98	29.3
108	2.54	0.81	24.2
111	2.58	0.77	23.0
114	2.72	0.63	18.8
117	2.66	0.69	20.6
120	2.68	0.67	20.0
123	2.60	0.75	22.4
126	2.55	0.80	23.9
129	2.63	0.72	21.5
132	2.74	0.61	18.2
135	2.56	0.79	23.6
138	2.42	0.93	27.8
141	2.44	0.91	27.2
144	2.62	0.73	21.8
147	2.80	0.55	16.4
150	2.70	0.65	19.4
153	2.70	0.65	19.4
156	2.76	0.59	17.6
159	2.94	0.41	12.2
162	2.71	0.64	19.1
165	2.64	0.71	21.2

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
648	2.48	0.87	26.0
651	2.39	0.96	28.7
654	2.45	0.90	26.9
657	2.40	0.95	28.4
660	2.83	0.52	15.5
663	2.70	0.65	19.4
666	2.70	0.65	19.4
669	2.50	0.85	25.4
672	2.62	0.73	21.8
675	2.66	0.69	20.6
678	2.62	0.73	21.8
681	2.51	0.84	25.1
684	2.54	0.81	24.2
687	2.51	0.84	25.1
690	2.41	0.94	28.1
693	2.60	0.75	22.4
696	2.52	0.83	24.8
699	2.34	1.01	30.1
702	2.45	0.90	26.9
705	2.52	0.83	24.8
708	2.60	0.75	22.4
711	2.64	0.71	21.2
714	2.46	0.89	26.6
717	2.47	0.88	26.3
720	2.47	0.88	26.3
723	2.47	0.88	26.3
726	2.32	1.03	30.7
729	2.44	0.91	27.2

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
1212	2.35	1.00	29.9
1215	2.40	0.95	28.4
1218	2.35	1.00	29.9
1221	2.40	0.95	28.4
1224	2.51	0.84	25.1
1227	2.45	0.90	26.9
1230	2.50	0.85	25.4
1233	2.55	0.80	23.9
1236	2.59	0.76	22.7
1239	2.47	0.88	26.3
1242	2.67	0.68	20.3
1245	2.70	0.65	19.4
1248	2.49	0.86	25.7
1251	2.38	0.97	29.0
1254	2.48	0.87	26.0
1257	2.40	0.95	28.4
1260	2.38	0.97	29.0
1263	2.50	0.85	25.4
1266	2.40	0.95	28.4
1269	2.44	0.91	27.2
1272	2.55	0.80	23.9
1275	2.66	0.69	20.6
1278	2.77	0.58	17.3
1281	2.82	0.53	15.8
1284	2.71	0.64	19.1
1287	2.80	0.55	16.4
1290	2.20	1.15	34.3
1293	2.25	1.10	32.8

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ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
168	2.71	0.64	19.1	732	2.58	0.77	23.0	1296	2.62	0.73	21.8
171	2.70	0.65	19.4	735	2.37	0.98	29.3	1299	2.60	0.75	22.4
174	2.70	0.65	19.4	738	2.53	0.82	24.5	1302	2.53	0.82	24.5
177	2.90	0.45	13.4	741	2.70	0.65	19.4	1305	2.54	0.81	24.2
180	3.00	0.35	10.4	744	2.39	0.96	28.7	1308	2.68	0.67	20.0
183	3.00	0.35	10.4	747	2.47	0.88	26.3	1311	2.60	0.75	22.4
186	3.17	0.18	5.4	750	2.74	0.61	18.2	1314	2.59	0.76	22.7
189	3.02	0.33	9.9	753	2.50	0.85	25.4	1317	2.67	0.68	20.3
192	3.06	0.29	8.7	756	2.53	0.82	24.5	1320	2.70	0.65	19.4
195	2.72	0.63	18.8	759	2.55	0.80	23.9	1323	2.70	0.65	19.4
198	2.74	0.61	18.2	762	2.49	0.86	25.7	1326	2.78	0.57	17.0
201	2.77	0.58	17.3	765	2.33	1.02	30.4	1329	3.01	0.34	10.1
204	2.57	0.78	23.3	768	2.37	0.98	29.3	1332	2.73	0.62	18.5
207	2.70	0.65	19.4	771	2.38	0.97	29.0	1335	2.84	0.51	15.2
210	3.02	0.33	9.9	774	2.52	0.83	24.8	1338	2.68	0.67	20.0
213	2.96	0.39	11.6	777	2.40	0.95	28.4	1341	2.88	0.47	14.0
216	2.90	0.45	13.4	780	2.59	0.76	22.7	1344	2.82	0.53	15.8
219	2.76	0.59	17.6	783	2.47	0.88	26.3	1347	2.85	0.50	14.9
222	2.83	0.52	15.5	786	2.47	0.88	26.3	1350	2.76	0.59	17.6
225	2.77	0.58	17.3	789	2.55	0.80	23.9	1353	2.55	0.80	23.9
228	2.64	0.71	21.2	792	2.56	0.79	23.6	1356	2.62	0.73	21.8
231	2.90	0.45	13.4	795	2.60	0.75	22.4	1359	2.62	0.73	21.8
234	2.73	0.62	18.5	798	2.33	1.02	30.4	1362	2.61	0.74	22.1
237	2.63	0.72	21.5	801	2.27	1.08	32.2	1365	2.60	0.75	22.4
240	2.75	0.60	17.9	804	2.27	1.08	32.2	1368	2.80	0.55	16.4
243	2.83	0.52	15.5	807	2.30	1.05	31.3	1371	2.77	0.58	17.3
246	2.79	0.56	16.7	810	2.34	1.01	30.1	1374	2.82	0.53	15.8
249	2.95	0.40	11.9	813	2.45	0.90	26.9	1377	2.72	0.63	18.8

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252	2.61	0.74	22.1	816	2.45	0.90	26.9	1380	2.48	0.87	26.0
255	2.60	0.75	22.4	819	2.60	0.75	22.4	1383	2.54	0.81	24.2
258	2.99	0.36	10.7	822	2.41	0.94	28.1	1386	2.63	0.72	21.5
261	3.10	0.25	7.5	825	2.68	0.67	20.0	1389	2.70	0.65	19.4
264	2.80	0.55	16.4	828	2.33	1.02	30.4	1392	2.54	0.81	24.2
267	2.90	0.45	13.4	831	2.21	1.14	34.0	1395	2.84	0.51	15.2
270	2.76	0.59	17.6	834	2.19	1.16	34.6	1398	2.70	0.65	19.4
273	2.75	0.60	17.9	837	2.17	1.18	35.2	1401	2.72	0.63	18.8
276	3.04	0.31	9.3	840	2.17	1.18	35.2	1404	2.76	0.59	17.6
279	3.05	0.30	9.0	843	2.14	1.21	36.1	1407	2.51	0.84	25.1
282	2.94	0.41	12.2	846	2.21	1.14	34.0	1410	2.52	0.83	24.8
285	3.00	0.35	10.4	849	2.25	1.10	32.8	1413	2.60	0.75	22.4
288	3.10	0.25	7.5	852	2.26	1.09	32.5	1416	2.51	0.84	25.1
291	3.10	0.25	7.5	855	2.30	1.05	31.3	1419	2.62	0.73	21.8
294	3.24	0.11	3.3	858	2.26	1.09	32.5	1422	2.64	0.71	21.2
297	3.06	0.29	8.7	861	2.30	1.05	31.3	1425	2.70	0.65	19.4
300	3.10	0.25	7.5	864	2.22	1.13	33.7	1428	2.64	0.71	21.2
303	2.80	0.55	16.4	867	2.02	1.33	39.7	1431	2.50	0.85	25.4
306	2.70	0.65	19.4	870	2.24	1.11	33.1	1434	2.56	0.79	23.6
309	2.80	0.55	16.4	873	2.22	1.13	33.7	1437	2.40	0.95	28.4
312	2.83	0.52	15.5	876	2.33	1.02	30.4	1440	2.46	0.89	26.6
315	3.10	0.25	7.5	879	2.32	1.03	30.7	1443	2.48	0.87	26.0
318	2.99	0.36	10.7	882	2.30	1.05	31.3	1446	2.45	0.90	26.9
321	2.87	0.48	14.3	885	2.44	0.91	27.2	1449	2.50	0.85	25.4
324	2.94	0.41	12.2	888	2.46	0.89	26.6	1452	2.50	0.85	25.4
327	2.80	0.55	16.4	891	2.43	0.92	27.5	1455	2.45	0.90	26.9
330	2.68	0.67	20.0	894	2.56	0.79	23.6	1458	2.42	0.93	27.8
333	2.67	0.68	20.3	897	2.30	1.05	31.3	1461	2.52	0.83	24.8

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336	2.66	0.69	20.6	900	2.43	0.92	27.5	1464	2.67	0.68	20.3
339	2.62	0.73	21.8	903	2.55	0.80	23.9	1467	2.54	0.81	24.2
342	2.86	0.49	14.6	906	2.52	0.83	24.8	1470	2.60	0.75	22.4
345	2.98	0.37	11.0	909	2.44	0.91	27.2	1473	2.66	0.69	20.6
348	2.78	0.57	17.0	912	2.50	0.85	25.4	1476	2.57	0.78	23.3
351	2.60	0.75	22.4	915	2.38	0.97	29.0	1479	2.45	0.90	26.9
354	2.74	0.61	18.2	918	2.57	0.78	23.3	1482	2.54	0.81	24.2
357	2.68	0.67	20.0	921	2.58	0.77	23.0	1485	2.40	0.95	28.4
360	2.76	0.59	17.6	924	2.39	0.96	28.7	1488	2.75	0.60	17.9
363	2.68	0.67	20.0	927	2.54	0.81	24.2	1491	2.65	0.70	20.9
366	2.77	0.58	17.3	930	2.54	0.81	24.2	1494	2.67	0.68	20.3
369	2.79	0.56	16.7	933	2.50	0.85	25.4	1497	2.52	0.83	24.8
372	2.87	0.48	14.3	936	2.63	0.72	21.5	1500	2.60	0.75	22.4
375	3.00	0.35	10.4	939	2.34	1.01	30.1	1503	2.65	0.70	20.9
378	3.04	0.31	9.3	942	2.37	0.98	29.3	1506	2.63	0.72	21.5
381	3.08	0.27	8.1	945	2.31	1.04	31.0	1509	2.65	0.70	20.9
384	2.89	0.46	13.7	948	2.52	0.83	24.8	1512	2.60	0.75	22.4
387	2.84	0.51	15.2	951	2.48	0.87	26.0	1515	2.32	1.03	30.7
390	2.74	0.61	18.2	954	2.41	0.94	28.1	1518	2.33	1.02	30.4
393	2.75	0.60	17.9	957	2.20	1.15	34.3	1521	2.26	1.09	32.5
396	2.74	0.61	18.2	960	2.15	1.20	35.8	1524	2.36	0.99	29.6
399	2.85	0.50	14.9	963	2.20	1.15	34.3	1527	2.40	0.95	28.4
402	2.76	0.59	17.6	966	2.34	1.01	30.1	1530	2.32	1.03	30.7
405	2.86	0.49	14.6	969	2.30	1.05	31.3	1533	2.27	1.08	32.2
408	3.11	0.24	7.2	972	2.21	1.14	34.0	1536	2.44	0.91	27.2
411	2.85	0.50	14.9	975	2.23	1.12	33.4	1539	2.60	0.75	22.4
414	2.84	0.51	15.2	978	2.14	1.21	36.1	1542	2.49	0.86	25.7
417	2.94	0.41	12.2	981	2.25	1.10	32.8	1545	2.50	0.85	25.4

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420	2.79	0.56	16.7	984	2.26	1.09	32.5	1548	2.73	0.62	18.5
423	2.90	0.45	13.4	987	2.46	0.89	26.6	1551	2.70	0.65	19.4
426	2.85	0.50	14.9	990	2.74	0.61	18.2	1554	2.62	0.73	21.8
429	3.04	0.31	9.3	993	2.70	0.65	19.4	1557	2.46	0.89	26.6
432	3.10	0.25	7.5	996	2.47	0.88	26.3	1560	2.52	0.83	24.8
435	2.86	0.49	14.6	999	2.37	0.98	29.3	1563	2.60	0.75	22.4
438	2.77	0.58	17.3	1002	2.46	0.89	26.6	1566	2.80	0.55	16.4
441	2.70	0.65	19.4	1005	2.35	1.00	29.9	1569	2.85	0.50	14.9
444	2.74	0.61	18.2	1008	2.20	1.15	34.3	1572	2.79	0.56	16.7
447	2.80	0.55	16.4	1011	2.39	0.96	28.7	1575	2.83	0.52	15.5
450	2.98	0.37	11.0	1014	2.59	0.76	22.7	1578	2.81	0.54	16.1
453	3.20	0.15	4.5	1017	2.61	0.74	22.1	1581	2.82	0.53	15.8
456	3.22	0.13	3.9	1020	2.59	0.76	22.7	1584	2.98	0.37	11.0
459	3.35	0.00	0.0	1023	2.50	0.85	25.4	1587	2.84	0.51	15.2
462	3.35	0.00	0.0	1026	2.45	0.90	26.9	1590	2.97	0.38	11.3
465	3.30	0.05	1.5	1029	2.54	0.81	24.2	1593	3.05	0.30	9.0
468	3.24	0.11	3.3	1032	2.61	0.74	22.1	1596	3.00	0.35	10.4
471	2.90	0.45	13.4	1035	2.44	0.91	27.2	1599	3.06	0.29	8.7
474	2.69	0.66	19.7	1038	2.51	0.84	25.1	1602	2.85	0.50	14.9
477	2.90	0.45	13.4	1041	2.38	0.97	29.0	1605	2.94	0.41	12.2
480	2.97	0.38	11.3	1044	2.45	0.90	26.9	1608	2.92	0.43	12.8
483	2.84	0.51	15.2	1047	2.53	0.82	24.5	1611	2.98	0.37	11.0
486	2.77	0.58	17.3	1050	2.45	0.90	26.9	1614	2.91	0.44	13.1
489	2.70	0.65	19.4	1053	2.35	1.00	29.9	1617	2.89	0.46	13.7
492	2.53	0.82	24.5	1056	2.54	0.81	24.2	1620	2.93	0.42	12.5
495	2.67	0.68	20.3	1059	2.59	0.76	22.7	1623	2.90	0.45	13.4
498	2.78	0.57	17.0	1062	2.76	0.59	17.6	1626	3.09	0.26	7.8
501	2.80	0.55	16.4	1065	2.70	0.65	19.4	1629	3.02	0.33	9.9

LINGAN COLLIERY
ARCH SURVEY OF 10 EAST TOP
NOVEMBER 20,1987
ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
504	2.74	0.61	18.2
507	2.73	0.62	18.5
510	2.68	0.67	20.0
513	2.84	0.51	15.2
516	2.55	0.80	23.9
519	2.82	0.53	15.8
522	2.51	0.84	25.1
525	2.68	0.67	20.0
528	2.56	0.79	23.6
531	2.52	0.83	24.8
534	2.52	0.83	24.8
537	2.52	0.83	24.8
540	2.71	0.64	19.1
543	2.83	0.52	15.5
546	2.71	0.64	19.1
549	2.60	0.75	22.4
552	2.60	0.75	22.4
555	2.51	0.84	25.1
558	2.62	0.73	21.8
561	2.74	0.61	18.2

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
1068	2.87	0.48	14.3
1071	2.94	0.41	12.2
1074	2.68	0.67	20.0
1077	2.80	0.55	16.4
1080	2.75	0.60	17.9
1083	2.60	0.75	22.4
1086	2.67	0.68	20.3
1089	2.93	0.42	12.5
1092	2.88	0.47	14.0
1095	2.73	0.62	18.5
1098	2.90	0.45	13.4
1101	2.80	0.55	16.4
1104	2.55	0.80	23.9
1107	2.60	0.75	22.4
1110	2.66	0.69	20.6
1113	3.00	0.35	10.4
1116	2.81	0.54	16.1
1119	2.70	0.65	19.4
1122	2.54	0.81	24.2
1125	2.75	0.60	17.9

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
1632	2.99	0.36	10.7
1635	3.00	0.35	10.4
1638	3.05	0.30	9.0
1641	2.97	0.38	11.3
1643	2.87	0.48	14.3
1646	2.97	0.38	11.3
1649	2.90	0.45	13.4
1652	2.85	0.50	14.9
1655	3.13	0.22	6.6
1658	2.90	0.45	13.4
1661	3.07	0.28	8.4
1664	2.90	0.45	13.4
1667	3.03	0.32	9.6
1670	3.23	0.12	3.6
1673	3.17	0.18	5.4
1676	3.05	0.30	9.0
1679	3.09	0.26	7.8
1682	3.25	0.10	3.0
1685	3.25	0.10	3.0

APPENDIX D

10 East Bottom Level

LINGAN COLLIERY
ARCH SURVEY OF 10 EAST BOTTON
NOVEMBER 23,1987
ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
0	2.78	0.57	17.0	567	2.40	0.95	28.4	1134	2.43	0.92	27.46
3	2.78	0.57	17.0	570	2.63	0.72	21.5	1137	2.38	0.97	28.96
6	2.71	0.64	19.1	573	2.20	1.15	34.3	1140	2.40	0.95	28.36
9	2.72	0.63	18.8	576	2.79	0.56	16.7	1143	2.06	1.29	38.51
12	2.61	0.74	22.1	579	2.96	0.39	11.6	1146	2.20	1.15	34.33
15	2.67	0.68	20.3	582	2.85	0.50	14.9	1149	2.28	1.07	31.94
18	2.83	0.52	15.5	585	2.86	0.49	14.6	1152	2.37	0.98	29.25
21	2.56	0.79	23.6	588	2.87	0.48	14.3	1155	2.45	0.90	26.87
24	2.53	0.82	24.5	591	2.86	0.49	14.6	1158	2.55	0.80	23.88
27	2.50	0.85	25.4	594	2.68	0.67	20.0	1161	2.54	0.81	24.18
30	2.63	0.72	21.5	597	2.14	1.21	36.1	1164	2.71	0.64	19.10
33	2.40	0.95	28.4	600	2.74	0.61	18.2	1167	2.54	0.81	24.18
36	2.41	0.94	28.1	603	2.66	0.69	20.6	1170	2.61	0.74	22.09
39	2.60	0.75	22.4	606	2.55	0.80	23.9	1173	2.57	0.78	23.28
42	2.45	0.90	26.9	609	2.82	0.53	15.8	1176	2.56	0.79	23.58
45	2.48	0.87	26.0	612	2.66	0.69	20.6	1179	2.57	0.78	23.28
48	2.61	0.74	22.1	615	2.68	0.67	20.0	1182	2.52	0.83	24.78
51	2.65	0.70	20.9	618	2.45	0.90	26.9	1185	2.48	0.87	25.97
54	2.54	0.81	24.2	621	2.38	0.97	29.0	1188	2.46	0.89	26.57
57	2.38	0.97	29.0	624	2.31	1.04	31.0	1191	2.31	1.04	31.04
60	2.40	0.95	28.4	627	2.54	0.81	24.2	1194	2.33	1.02	30.45
63	2.50	0.85	25.4	630	2.67	0.68	20.3	1197	2.24	1.11	33.13
66	2.45	0.90	26.9	633	2.67	0.68	20.3	1200	2.14	1.21	36.12
69	2.24	1.11	33.1	636	2.68	0.67	20.0	1203	2.17	1.18	35.22
72	2.02	1.33	39.7	639	2.66	0.69	20.6	1206	2.30	1.05	31.34
75	2.31	1.04	31.0	642	2.76	0.59	17.6	1209	2.28	1.07	31.94
78	2.84	0.51	15.2	645	2.66	0.69	20.6	1212	2.46	0.89	26.57
81	2.52	0.83	24.8	648	2.70	0.65	19.4	1215	2.40	0.95	28.36

LINGAN COLLIERY
ARCH SURVEY OF 10 EAST BOTTOM
NOVEMBER 23,1987
ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
84	2.00	1.35	40.3	651	2.75	0.60	17.9	1218	2.52	0.83	24.78
87	2.00	1.35	40.3	654	2.86	0.49	14.6	1221	2.50	0.85	25.37
90	2.03	1.32	39.4	657	2.52	0.83	24.8	1224	2.64	0.71	21.19
93	2.42	0.93	27.8	660	2.75	0.60	17.9	1227	2.52	0.83	24.78
96	2.48	0.87	26.0	663	2.77	0.58	17.3	1230	2.43	0.92	27.46
99	2.52	0.83	24.8	666	2.65	0.70	20.9	1233	2.56	0.79	23.58
102	2.59	0.76	22.7	669	2.65	0.70	20.9	1236	2.49	0.86	25.67
105	2.79	0.56	16.7	672	2.79	0.56	16.7	1239	2.48	0.87	25.97
108	2.66	0.69	20.6	675	2.85	0.50	14.9	1242	2.37	0.98	29.25
111	2.65	0.70	20.9	678	2.82	0.53	15.8	1245	2.21	1.14	34.03
114	2.69	0.66	19.7	681	2.84	0.51	15.2	1248	2.55	0.80	23.88
117	2.70	0.65	19.4	684	2.70	0.65	19.4	1251	2.46	0.89	26.57
120	2.67	0.68	20.3	687	2.79	0.56	16.7	1254	2.41	0.94	28.06
123	2.67	0.68	20.3	690	2.63	0.72	21.5	1257	2.13	1.22	36.42
126	2.82	0.53	15.8	693	2.60	0.75	22.4	1260	2.12	1.23	36.72
129	2.72	0.63	18.8	696	2.65	0.70	20.9	1263	2.21	1.14	34.03
132	2.80	0.55	16.4	699	2.78	0.57	17.0	1266	2.16	1.19	35.52
135	2.77	0.58	17.3	702	2.80	0.55	16.4	1269	2.22	1.13	33.73
138	2.66	0.69	20.6	705	2.70	0.65	19.4	1272	2.49	0.86	25.67
141	2.82	0.53	15.8	708	2.57	0.78	23.3	1275	2.47	0.88	26.27
144	2.73	0.62	18.5	711	2.30	1.05	31.3	1278	2.46	0.89	26.57
147	2.87	0.48	14.3	714	2.42	0.93	27.8	1281	2.44	0.91	27.16
150	2.75	0.60	17.9	717	2.45	0.90	26.9	1284	2.32	1.03	30.75
153	2.65	0.70	20.9	720	2.44	0.91	27.2	1287	2.50	0.85	25.37
156	2.70	0.65	19.4	723	2.60	0.75	22.4	1290	2.19	1.16	34.63
159	2.74	0.61	18.2	726	2.18	1.17	34.9	1293	2.34	1.01	30.15
162	2.81	0.54	16.1	729	2.29	1.06	31.6	1296	2.21	1.14	34.03
165	2.84	0.51	15.2	732	2.35	1.00	29.9	1299	2.27	1.08	32.24

LINGAN COLLIERY
ARCH SURVEY OF 10 EAST BOTTON
NOVEMBER 23,1987
ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
168	2.88	0.47	14.0
171	2.62	0.73	21.8
174	2.74	0.61	18.2
177	2.68	0.67	20.0
180	2.58	0.77	23.0
183	2.72	0.63	18.8
186	2.70	0.65	19.4
189	2.55	0.80	23.9
192	2.51	0.84	25.1
195	2.70	0.65	19.4
198	2.83	0.52	15.5
201	2.82	0.53	15.8
204	2.83	0.52	15.5
207	2.90	0.45	13.4
210	2.82	0.53	15.8
213	2.77	0.58	17.3
216	2.89	0.46	13.7
219	2.85	0.50	14.9
222	2.88	0.47	14.0
225	2.84	0.51	15.2
228	2.78	0.57	17.0
231	2.74	0.61	18.2
234	2.81	0.54	16.1
237	2.85	0.50	14.9
240	2.66	0.69	20.6
243	2.79	0.56	16.7
246	2.93	0.42	12.5
249	2.83	0.52	15.5

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
735	2.30	1.05	31.3
738	2.29	1.06	31.6
741	2.31	1.04	31.0
744	2.37	0.98	29.3
747	2.40	0.95	28.4
750	2.34	1.01	30.1
753	2.16	1.19	35.5
756	2.20	1.15	34.3
759	2.33	1.02	30.4
762	2.36	0.99	29.6
765	2.30	1.05	31.3
768	2.31	1.04	31.0
771	2.27	1.08	32.2
774	2.31	1.04	31.0
777	2.24	1.11	33.1
780	2.22	1.13	33.7
783	2.29	1.06	31.6
786	2.40	0.95	28.4
789	2.33	1.02	30.4
792	2.31	1.04	31.0
795	2.28	1.07	31.9
798	2.33	1.02	30.4
801	2.47	0.88	26.3
804	2.39	0.96	28.7
807	2.55	0.80	23.9
810	2.38	0.97	29.0
813	2.42	0.93	27.8
816	2.43	0.92	27.5

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
1302	2.20	1.15	34.33
1305	2.30	1.05	31.34
1308	2.28	1.07	31.94
1311	2.30	1.05	31.34
1314	2.33	1.02	30.45
1317	2.22	1.13	33.73
1320	2.32	1.03	30.75
1323	2.43	0.92	27.46
1326	2.57	0.78	23.28
1329	2.52	0.83	24.78
1332	2.41	0.94	28.06
1335	2.50	0.85	25.37
1338	2.28	1.07	31.94
1341	2.26	1.09	32.54
1344	2.28	1.07	31.94
1347	2.26	1.09	32.54
1350	2.44	0.91	27.16
1353	2.33	1.02	30.45
1356	2.58	0.77	22.99
1359	2.58	0.77	22.99
1362	2.56	0.79	23.58
1365	2.55	0.80	23.88
1368	2.32	1.03	30.75
1371	2.50	0.85	25.37
1374	2.36	0.99	29.55
1377	2.30	1.05	31.34
1380	2.35	1.00	29.85
1383	2.44	0.91	27.16

LINGAN COLLIERY
ARCH SURVEY OF 10 EAST BOTTOM
NOVEMBER 23,1987
ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
252	2.74	0.61	18.2	819	2.43	0.92	27.5	1386	2.09	1.26	37.61
255	2.90	0.45	13.4	822	2.42	0.93	27.8	1389	2.32	1.03	30.75
258	2.71	0.64	19.1	825	2.43	0.92	27.5	1392	2.15	1.20	35.82
261	2.63	0.72	21.5	828	2.46	0.89	26.6	1395	2.20	1.15	34.33
264	2.67	0.68	20.3	831	2.38	0.97	29.0	1398	2.19	1.16	34.63
267	2.36	0.99	29.6	834	2.33	1.02	30.4	1401	2.30	1.05	31.34
270	2.47	0.88	26.3	837	2.22	1.13	33.7	1404	2.15	1.20	35.82
273	2.47	0.88	26.3	840	2.35	1.00	29.9	1407	2.24	1.11	33.13
276	2.57	0.78	23.3	843	2.31	1.04	31.0	1410	2.14	1.21	36.12
279	2.62	0.73	21.8	846	2.36	0.99	29.6	1413	2.46	0.89	26.57
282	2.68	0.67	20.0	849	2.15	1.20	35.8	1416	1.91	1.44	42.99
285	2.65	0.70	20.9	852	2.29	1.06	31.6	1419	1.96	1.39	41.49
288	3.01	0.34	10.1	855	2.26	1.09	32.5	1422	2.13	1.22	36.42
291	2.80	0.55	16.4	858	2.44	0.91	27.2	1425	2.22	1.13	33.73
294	2.73	0.62	18.5	861	2.36	0.99	29.6	1428	2.36	0.99	29.55
297	2.62	0.73	21.8	864	2.23	1.12	33.4	1431	2.22	1.13	33.73
300	2.73	0.62	18.5	867	2.23	1.12	33.4	1434	2.29	1.06	31.64
303	2.68	0.67	20.0	870	2.15	1.20	35.8	1437	2.37	0.98	29.25
306	2.68	0.67	20.0	873	2.19	1.16	34.6	1440	2.57	0.78	23.28
309	2.74	0.61	18.2	876	2.05	1.30	38.8	1443	2.39	0.96	28.66
312	2.83	0.52	15.5	879	2.13	1.22	36.42	1446	2.50	0.85	25.37
315	2.74	0.61	18.2	882	2.12	1.23	36.72	1449	2.46	0.89	26.57
318	2.68	0.67	20.0	885	2.08	1.27	37.91	1452	2.41	0.94	28.06
321	2.69	0.66	19.7	888	2.28	1.07	31.94	1455	2.52	0.83	24.78
324	2.73	0.62	18.5	891	2.53	0.82	24.48	1458	2.44	0.91	27.16
327	2.69	0.66	19.7	894	2.44	0.91	27.16	1461	2.63	0.72	21.49
330	2.50	0.85	25.4	897	2.40	0.95	28.36	1464	2.52	0.83	24.78
333	2.60	0.75	22.4	900	2.47	0.88	26.27	1467	2.50	0.85	25.37

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ARCH SURVEY OF 10 EAST BOTTON
NOVEMBER 23,1987
ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
336	2.61	0.74	22.1	903	2.36	0.99	29.55	1470	2.47	0.88	26.27
339	2.58	0.77	23.0	906	2.29	1.06	31.64	1473	2.60	0.75	22.39
342	2.62	0.73	21.8	909	2.25	1.10	32.84	1476	2.43	0.92	27.46
345	2.86	0.49	14.6	912	2.40	0.95	28.36	1479	2.50	0.85	25.37
348	2.85	0.50	14.9	915	2.20	1.15	34.33	1482	2.60	0.75	22.39
351	2.81	0.54	16.1	918	2.36	0.99	29.55	1485	2.60	0.75	22.39
354	2.78	0.57	17.0	921	2.22	1.13	33.73	1488	2.56	0.79	23.58
357	2.57	0.78	23.3	924	2.24	1.11	33.13	1491	2.58	0.77	22.99
360	2.46	0.89	26.6	927	2.00	1.35	40.30	1494	2.68	0.67	20.00
363	2.60	0.75	22.4	930	2.17	1.18	35.22	1497	2.60	0.75	22.39
366	2.32	1.03	30.7	933	2.12	1.23	36.72	1500	2.61	0.74	22.09
369	2.66	0.69	20.6	936	2.34	1.01	30.15	1503	2.90	0.45	13.43
372	2.65	0.70	20.9	939	2.40	0.95	28.36	1506	2.68	0.67	20.00
375	2.65	0.70	20.9	942	2.50	0.85	25.37	1509	2.63	0.72	21.49
378	2.60	0.75	22.4	945	2.34	1.01	30.15	1512	2.59	0.76	22.69
381	2.66	0.69	20.6	948	2.31	1.04	31.04	1515	2.70	0.65	19.40
384	2.63	0.72	21.5	951	2.36	0.99	29.55	1518	2.63	0.72	21.49
387	2.57	0.78	23.3	954	2.26	1.09	32.54	1521	2.60	0.75	22.39
390	2.69	0.66	19.7	957	2.34	1.01	30.15	1524	2.53	0.82	24.48
393	2.62	0.73	21.8	960	2.45	0.90	26.87	1527	2.60	0.75	22.39
396	2.47	0.88	26.3	963	2.40	0.95	28.36	1530	2.69	0.66	19.70
399	2.44	0.91	27.2	966	2.36	0.99	29.55	1533	2.62	0.73	21.79
402	2.54	0.81	24.2	969	2.32	1.03	30.75	1536	2.59	0.76	22.69
405	2.56	0.79	23.6	972	2.26	1.09	32.54	1539	2.48	0.87	25.97
408	2.52	0.83	24.8	975	2.38	0.97	28.96	1542	2.55	0.80	23.88
411	2.51	0.84	25.1	978	2.31	1.04	31.04	1545	2.60	0.75	22.39
414	2.51	0.84	25.1	981	2.37	0.98	29.25	1548	2.65	0.70	20.90
417	2.50	0.85	25.4	984	2.28	1.07	31.94	1551	2.50	0.85	25.37

LINGAN COLLIERY
ARCH SURVEY OF 10 EAST BOTTON
NOVEMBER 23,1987
ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)	ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
420	2.50	0.85	25.4	987	2.30	1.05	31.34	1554	2.61	0.74	22.09
423	2.58	0.77	23.0	990	2.35	1.00	29.85	1557	2.61	0.74	22.09
426	2.59	0.76	22.7	993	2.32	1.03	30.75	1560	2.82	0.53	15.82
429	2.45	0.90	26.9	996	2.42	0.93	27.76	1563	2.90	0.45	13.43
432	2.35	1.00	29.9	999	2.40	0.95	28.36	1566	2.83	0.52	15.52
435	2.55	0.80	23.9	1002	2.50	0.85	25.37	1569	2.95	0.40	11.94
438	2.48	0.87	26.0	1005	2.37	0.98	29.25	1572	2.69	0.66	19.70
441	2.56	0.79	23.6	1008	2.25	1.10	32.84	1575	2.72	0.63	18.81
444	2.30	1.05	31.3	1011	2.20	1.15	34.33	1578	2.65	0.70	20.90
447	2.52	0.83	24.8	1014	2.21	1.14	34.03	1581	2.72	0.63	18.81
450	2.44	0.91	27.2	1017	2.09	1.26	37.61	1584	2.75	0.60	17.91
453	2.55	0.80	23.9	1020	2.25	1.10	32.84	1587	2.83	0.52	15.52
456	2.48	0.87	26.0	1023	2.34	1.01	30.15	1590	2.64	0.71	21.19
459	2.45	0.90	26.9	1026	2.42	0.93	27.76	1593	2.82	0.53	15.82
462	2.52	0.83	24.8	1029	2.42	0.93	27.76	1596	2.60	0.75	22.39
465	2.54	0.81	24.2	1032	2.44	0.91	27.16	1599	2.66	0.69	20.60
468	2.37	0.98	29.3	1035	2.34	1.01	30.15	1602	2.69	0.66	19.70
471	2.49	0.86	25.7	1038	2.23	1.12	33.43	1605	2.84	0.51	15.22
474	2.51	0.84	25.1	1041	2.26	1.09	32.54	1608	2.94	0.41	12.24
477	2.47	0.88	26.3	1044	2.31	1.04	31.04	1611	3.03	0.32	9.55
480	2.46	0.89	26.6	1047	2.39	0.96	28.66	1614	2.94	0.41	12.24
483	2.46	0.89	26.6	1050	2.48	0.87	25.97	1617	3.00	0.35	10.45
486	2.39	0.96	28.7	1053	2.31	1.04	31.04	1620	2.74	0.61	18.21
489	2.25	1.10	32.8	1056	2.48	0.87	25.97	1623	2.94	0.41	12.24
492	2.19	1.16	34.6	1059	2.41	0.94	28.06	1626	2.85	0.50	14.93
495	2.25	1.10	32.8	1062	2.14	1.21	36.12	1629	3.02	0.33	9.85
498	2.06	1.29	38.5	1065	2.23	1.12	33.43	1632	3.00	0.35	10.45
501	2.07	1.28	38.2	1068	2.14	1.21	36.12	1635	3.00	0.35	10.45

LINGAN COLLIERY
ARCH SURVEY OF 10 EAST BOTTOM
NOVEMBER 23,1987
ORIGINAL ARCH HEIGHT IS 3.35 METERS

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
504	2.14	1.21	36.1
507	2.20	1.15	34.3
510	2.20	1.15	34.3
513	2.00	1.35	40.3
516	2.34	1.01	30.1
519	2.13	1.22	36.4
522	2.34	1.01	30.1
525	2.24	1.11	33.1
528	2.11	1.24	37.0
531	2.10	1.25	37.3
534	2.10	1.25	37.3
537	2.02	1.33	39.7
540	2.04	1.31	39.1
543	2.27	1.08	32.2
546	2.28	1.07	31.9
549	2.48	0.87	26.0
552	2.47	0.88	26.3
555	2.47	0.88	26.3
558	2.32	1.03	30.7
561	2.56	0.79	23.6
564	2.20	1.15	34.3

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
1071	2.24	1.11	33.13
1074	2.19	1.16	34.63
1077	2.29	1.06	31.64
1080	2.26	1.09	32.54
1083	2.47	0.88	26.27
1086	2.15	1.20	35.82
1089	2.47	0.88	26.27
1092	2.25	1.10	32.84
1095	2.18	1.17	34.93
1098	2.20	1.15	34.33
1101	2.20	1.15	34.33
1104	2.15	1.20	35.82
1107	2.20	1.15	34.33
1110	2.51	0.84	25.07
1113	2.62	0.73	21.79
1116	2.38	0.97	28.96
1119	2.36	0.99	29.55
1122	2.50	0.85	25.37
1125	2.50	0.85	25.37
1128	2.46	0.89	26.57
1131	2.60	0.75	22.39

ARCH NUMBER	ARCH HEIGHT (M)	REDUCTION (M)	REDUCTION (%)
1638	3.04	0.31	9.25
1641	3.07	0.28	8.36
1644	2.99	0.36	10.75
1647	3.13	0.22	6.57
1650	2.74	0.61	18.21
1653	2.94	0.41	12.24
1656	3.10	0.25	7.46
1659	3.00	0.35	10.45
1662	3.15	0.20	5.97
1665	3.35	0.00	0.00
1668	2.70	0.65	19.40
1671	3.35	0.00	0.00
1674	3.15	0.20	5.97
1677	3.02	0.33	9.85
1680	3.35	0.00	0.00
1683	3.35	0.00	0.00
1686	3.35	0.00	0.00
1689	3.35	0.00	0.00
1692	3.35	0.00	0.00
1695	3.35	0.00	0.00